



SENSING THE LIVING BREATH

Professor Ulkuhan Guler works to create an all-in-one respiratory sensor patch.



SENSING THE LIVING BREATH

Electrical engineer Ulkuhan Guler works to create a small, smart, skin patch that collects critical measures of respiration.

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EDITOR
Kristen O'Reilly
wpjournal@wpi.edu

EXECUTIVE EDITOR
Jessica Grimes

CONTRIBUTING EDITORS
Ashley Dill
Peggy Isaacson
Judith Jaeger
Julia Quinn-Szcesuil
Allison Racicot

DESIGN & CREATIVE
Lynn Saunders
Todd Verlander

PRODUCTION MANAGER
Brian O'Connell

CONTRIBUTORS
Arthur Carlson
Michael Dorsey
Allison Duffy
Lisa Eckelbecker
Diana Fiorentino
Steve Foskett
Sira Naras Frongillo
Jessica Grimes
Judith Jaeger
Jack Levy
Julia Quinn-Szcesuil
Allison Racicot
Colleen Bamford Wamback
Scott Whitney

ILLUSTRATORS
Lapin
Ruaida Mannaa
Kathryn Rathke
Jonathan D. Reinfurt

PHOTOGRAPHY
Matthew Burgos
Scott Erb
John Gillooly
Tony Rinaldo
Danielle Sykes
Todd Verlander

WPI JOURNAL ONLINE
www.wpi.edu/+journal

CONTACT US
Email: wpjournal@wpi.edu
Class Notes: classnotes@wpi.edu
Address changes, phone/email updates: infoupdate@wpi.edu

EDITORIAL OFFICE
WPI Journal
100 Institute Road—Boynton Hall
Worcester, MA 01609



WPI Journal (ISSN 1538-5094) ©2022 is published quarterly by Worcester Polytechnic Institute (WPI) in conjunction with the WPI Alumni Association. Periodical postage paid non-profit at Worcester, Massachusetts, and additional entry offices. This publication is guided by WPI's principles of free expression and accepted standards of good taste. Opinions expressed in letters to the editor are of the signed contributors and do not represent the opinion or official position of WPI or its officers. POSTMASTER: Please send address changes, Form 3579, to WPI Journal, Worcester Polytechnic Institute, 100 Institute Road, Worcester, MA 01609-2280.

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LETTERS

Letters to the editor may be altered for length, clarity, and accuracy. We ask that letters offer the reader's opinion without rancor. Letters that mock or insult will not be published. Opinions expressed do not necessarily reflect the views of WPI. Send your letters to wpijournal@wpi.edu.

HOW MANY NATIONAL CHAMPIONS?

Nothing fills my editor's heart with more joy than when I get feedback from readers about stories in the *Journal*. So I was happy to hear from an alumnus who praised the Women's Varsity 8 rowers for their NCAA national championship effort, but questioned their distinction as WPI's second national champions as stated in the story (Summer 2022). Instead, he remembered that the 1974 men's bowling team was the first to bring home a national championship, a feat that was noted in *Sports Illustrated* due to the team's unlikely road to success. For more details on this achievement, see page 21 for Arthur Carlson's The Archivist column.

Upon investigation, it turns out we were technically correct—the bowling team did not compete in the NCAA and the story in question did specify the rowers were the second to win an NCAA national championship (golfer Eric Meerbach '87 was the first in 1986). Fun fact from Sports Information Director Rusty Eggen: Bowling only became an NCAA sport 20 years ago, and only for women. Not surprisingly, since the on-campus bowling alley is no longer, WPI does not now field either a men's or women's bowling team, NCAA sanctioned or not.

Furthermore, the bowling team was also not the first to bring home any national championship for WPI—that honor goes to Harry Dadmun, Class of 1891, who won the national championship in the half mile. According to a story in a 1989 *WPI Journal* by former Director of Public Relations Roger Perry Jr., Dadmun remained connected to the track team even after he retired, attending meets and informally advising coach Merl Norcross.

Please keep those reader feedback emails coming.

—Kristen O'Reilly, Editor

TO THE EDITOR

I was very interested in the article about Lens and Lights and its involvement with the analog projectors in the Fuller Labs (Summer 2022). I was a member of the Lens and Lights Club for three years, from 1972 through 1974, being the president my senior year.

I and several others in the club were licensed projectionists, but the projectors were in Alden Memorial Hall, not Fuller. My recollection is that the projection booth and projectors were installed during World War II when the WPI campus was used for officer training as part of the war effort.

What happened to those projectors?

At the time, Lens and Lights showed quite a number of movies with quite a large variety of genres, including *The Umbrellas of Cherbourg* for the Fine Arts Society and a very popular showing of *Myra Breckinridge*!

We also had a pair of portable 35MM projectors, with sound, that were used for movies shown in venues other than Alden. One of my fond memories was showing early Bollywood movies to students and families for the vibrant Indian community that was there at the time.

Regards,

—Mike Szteliga '74

Editor's Note: LNL head projectionist Thomas Piccione reports that two 35MM Simplex projectors are still in the club's possession. He says that because the Alden projection booth no longer exists, "one of them is fully assembled and functional, and lives on a pallet to be 'portable'; It gets brought out from time to time. The other is disassembled, but still complete. The functional one still has its original carbon arc, and it has been rewired to work, but for use indoors (or where we don't have sufficient power to run the arc), we have added a removable LED source. It came out for the LNL 60th Reunion and we ran a short of *Buck Rogers* in Alden, though not from the booth this time."

PHOTO BY MATTHEW BURGOS



WINSTON "WOLE" SOBOYEJO

"While the talent and passion inside WPI are extraordinary, we need to be intentional in welcoming others into our work. I invite you to ask what this might mean for you. Your time, talent, or treasure could be just the tipping point a WPI research initiative or project needs to change the world."

Sustainability and how we manage and adapt to climate change and its excesses—extensive droughts, catastrophic floods, raging wildfires, unclean drinking water, failing energy infrastructures, and rising sea levels—are almost certainly the biggest issues that we face today. Sustainability is inextricably meshed with every aspect of our being—from where we can live, to what can be grown for food, and to whether the air is safe to breathe.

How we sustain a vibrant and healthy society is an essential question and a complex set of problems. In true WPI form, our community is all in on the search for local and global solutions.

As doers who dare to dream big and who cast a wide net for partners and possibilities, members of the WPI community understand that the best ideas come from people working together. Or, in the case of Don Seville '92, working and living together. Director of the Sustainable Food Lab in a co-housing community in Vermont, Seville credits his WPI project experiences with impressing upon him the need to ground problem-solving in the context of people. The person and professional he would become was borne of a question from his mentor: "How do you want to live?" (Read more about Don's journey on page 35.)

I understand, having been similarly challenged to evaluate where my life was headed. Unimpressed with my early career success, my mother asked, "But what are you doing to help people?" Turns out that's a defining question here at WPI, as well. Through research, projects, and education, we're answering it by exploring opportunities to positively impact our climate, our food, our water, our energy, and how we can adapt to—and continue to thrive in—this challenging world of ours.

This focus on sustainability is rooted both in a desire to do the right thing and in recognizing that putting our knowledge into action, we create value and add to our distinctiveness. Across the pages of this magazine, and realized beyond them, are inspirational stories of solving problems and creating opportunities that matter to people—from a student project on renewable energy in the Rockies to technology that's providing more dignified sanitation in Ethiopia; from the potential of self-healing concrete to the promise of creating an even more efficient energy source for the growing electric car industry; from a new master's degree in climate change adaptation to specialized career fairs focused on environmental engineering, law, and entrepreneurship.

While the talent and passion inside WPI are extraordinary, we need to be intentional in welcoming others into our work. I invite you to ask what this might mean for you. Your time, talent, or treasure could be just the tipping point a WPI research initiative or project needs to change the world. I look forward to hearing from you. Drop me a line at president@wpi.edu.

Cheers,
Wole

BLACK HOLE 'SONIFICATION' BRINGS SYMPHONY TO LIFE

Arts & Sciences Adjunct Professor **David Ibbett** says he's happiest when he's getting to the heart of scientific concepts and bringing them to life through the language of music. It's a way of understanding the world that he teaches in his Music and Science course, and one that informs much of his own work.

That includes his latest piece, "Black Hole Symphony," which was performed in Hayden Planetarium at the Museum of Science in Boston this past summer. The concert was the culmination of three years of work and featured a live chamber orchestra and recorded electronic music, along with a narration and visual aspects, which were displayed on the planetarium dome.

Much like the performance itself, Ibbett's composition method is unique. He uses a process called "sonification," which involves gathering data from black holes and their sounding phenomena—traditionally displayed as a graph—and designing an algorithm to convert this data to sounds. The central sonification for the "Black Hole Symphony" is based on the electromagnetic spectrum of an active galaxy containing a supermassive black hole. Ibbett then embeds these sonifications in a larger musical piece that delivers an emotional and intellectual impact to the audience.

"This is art that is not only made in conjunction with science," he says, "but it also helps to communicate and share the joy of science."

In 2017 he founded a nonprofit called Multiverse Concert Series, which is a hub for these types of collaborations between music, art, and science. Three years ago, he met Anna Barnacka, an astrophysicist at the Center for Astrophysics at Harvard who was trying to sonify the jets of plasma from black holes.

"We discovered this shared interest of sonifying data to see if you can learn more about it by listening to it. Soon the idea of a narrative piece came together, and we thought about doing a symphony—the piece is a classical symphony at heart, with melodic themes and five movements," he says. "The metaphor in the piece is that each component of the black hole galaxy is like a musical instrument in an orchestra, and the black hole is the conductor telling everyone what to do and influencing them, silently."

—Jack Levy

ILLUSTRATION BY RUJDA MANNAA

ESTIMATING UNDERWATER PLUMES IN REAL TIME

Professors **Nikolaos Gatsonis** and **Michael Demetriou** have been awarded \$347,843 by the U.S. Navy to develop a computational model that will use data from a network of autonomous underwater vehicles (AUVs) to estimate in real time the concentration and source of a contaminant liquid or gas plume as it moves and diffuses through ocean waters.

The estimator, once deployed on a system of AUVs, could help guide responses to chemical or biological threats, accidents, and environmental disasters, says Gatsonis, professor and head of the Department of Aerospace Engineering.

"Locating the plume source and estimating in real time the concentration of a liquid or gas plume in ocean waters is complex but critical," Gatsonis says. "With better, faster detection and estimation of underwater plumes, the Navy and other agencies could respond to intrusions, submerged airplanes or vehicles, people who are trapped, and contaminants that should be contained or remediated."

Gatsonis and Demetriou, also a professor in the Department of Aerospace Engineering, will develop the algorithms that can be rapidly executed on computer hardware on AUVs. The model will allow at least three AUVs to patrol an area until a plume is detected, collect sensor data, and then begin estimating the plume's physical parameters. In addition, the model will allow AUVs to cooperate with one another, move to new locations to learn more about the plume, and continue working even if one or more AUVs fail.

WPI students, including one graduate student and multiple teams of undergraduate students, will contribute to the research. Part of the project will involve testing software on land with autonomous vehicles.

—Steve Foksett

THE REWARDS OF FAILURE

The WPI High Power Rocketry Club's entry for the 2022 Spaceport America Cup blew up a little less than halfway to its 10,000-foot goal last summer, but the team still found rewards amid the debris that fell out of the Southern New Mexico sky. In fact, it was the failure of the 12-foot-long solid-propellant rocket that ultimately proved as valuable as any trophy.

"It's part of the whole discovery process," says team captain **Kevin Schultz '23**. "We have to figure out what this is. It's a lot like solving a mystery and, as engineers, we really do enjoy that."

HPRC's 24-person travel team—part of a 135 members-strong club—joined 1,300 other participants, representing 150 student teams from 95 higher education institutes and 16 countries at this year's competition, held June 21–25. The competition, which calls for teams to construct a rocket and launch it with a small payload, is considered a premiere recruitment opportunity for sponsors, which this year included Sierra Space, Blue Origin, and Virgin Galactic.

WPI's team worked throughout the school year on the mostly scratch-built rocket, replicating the systems approach, collaborative work environment, and testing that graduates might experience working for a rocket design and manufacturing company. Design and computer software work started in A-Term, and by D-Term the team was integrating all the different subsystems.

Testing the rocket proved tricky; the team was able to test only various components using existing rockets, so its inaugural launch was in the actual competition. Brad Miller, former director of the Robotics Resource Center, who advised the team for the competition, says bringing a rocket that had not been fully tested was a tall order, but the students nearly pulled it off. So much had to go right—from proper deployment of the rocket's air brake system to nailing the algorithms that controlled its trajectory—and it very nearly did.

"If you look at the level of work they're doing, they're solving really hard problems," Miller says. "They're not just going out and buying a hobby rocket."

Miller says as soon as the rocket failed, everyone on the team immediately turned to doing failure analysis.

"They retrieved the rocket, got the flash cards, looked at the telemetry. They were figuring out graphs, coming up with all these theories. I can imagine other teams that had their rocket blow up at 3,500 feet would have just thrown in the towel. This team turned around and did a ton of work to find out what happened. I couldn't be more proud of these students representing WPI."

Throughout the competition, the WPI team offered help to other teams; Schultz says that with some epoxy, fiberglass, a heat gun, and some ideas, they helped the Duke University squad solve a problem and stay in the competition. And even after the WPI students' rocket exploded, they helped other entrants retrieve their rockets, and even helped direct first responders to the site of one that had caught fire after it came down.

The team's efforts didn't go unnoticed and garnered WPI the competition's annual Sportsmanship Award.

"We all worked so much together on this rocket, and a lot of times we're friends from other classes and other projects," Schultz says. "We're always working together, always collaborating, always talking together, working through the sticky situations. I think it spilled over into this competition."

—Steve Foskett

MICROFLUSH TOILETS REDUCE DISEASE WHILE CREATING COMPOST WITH WORMS

In some parts of the world, easy access to basic sanitation supplies and services is hard—if not near impossible—to find. According to UNICEF, more than 70% of the population in Eastern and Southern Africa, approximately 340 million people, have little to no access to soap and water for hand washing or facilities for the safe disposal of human waste. The World Health Organization notes that such basic sanitation services not only reduce the risk of disease and the impact of malnutrition, but also promote dignity and safety, and even boost school attendance.

To help address this considerable challenge, WPI students, researchers, and their partners are working to bring more adequate and dignified sanitation to Ethiopia at a reasonable cost. Through a five-year, \$900,000 grant awarded by the Bureau of Humanitarian Assistance at the United States Agency for International Development and by Catholic Relief Services, work is now underway to create a sustainable educational experience, improve the design, and implement WPI MicroFlush toilets—sustainable compost toilets that use handwashing water to flush.

The WPI MicroFlush toilets use a "pour flush" model in which water from the attached sink flushes the toilet when a user washes their hands—saving water while keeping the toilets off the grid, hygienic, and odor-free. The toilets accomplish these surprising feats with two key components—the MicroFlush valve and earthworms, which can digest and process waste, and through that process simultaneously create valuable compost and fertilizer for farms and gardens in the area.

The sanitation project is part of the new Stephen J. Mecca Lab for Sustainable Development at WPI, which is part of WPI's Institute for Science and Technology for Development (InSTeD). Mecca was a professor at Providence College who invented the technology that will be used in the toilets. The Mecca Lab brings together researchers from different disciplines and departments at WPI and other institutions, including the director of the lab, **Terrence McGoldrick**, a Providence College professor and WPI-affiliated researcher.

"The mission of this project is not only to increase access to sanitation and hygiene services, but also to create new educational and economic opportunities for people in the region, empowering them and increasing the project's impact," says McGoldrick. "If we succeed in moving the needle even a little bit on such a large problem in the world, it's going to make a big difference in people's lives."

To simultaneously create educational and economic pathways, the team will partner with vocational technical schools in Ethiopia. Through an educational program to build and maintain the toilets, pathways will be established for people to form small businesses centered around the implementation of the toilets.

"The really exciting part of the project is the partnership with the local community, which is designed to last well beyond the completion of the team's work," says **Rob Krueger**, founder and director of InSTeD and head of Social Science & Policy Studies at WPI. "The ultimate goal of the work is not just to design and build the toilets, but also to train people in Ethiopia to become maker agents—people who can start their own businesses and disseminate the knowledge and expertise they've gained to others."

—Jack Levy



FIRE EXPERTS HELP JOURNALISTS ANSWER A BURNING QUESTION

WPI fire protection engineers worked with *The New York Times* journalist **Jim Glanz** on a months-long investigation into a January 9, 2022, fire at a Bronx, N.Y., apartment building that claimed the lives of 17 people. The resulting report, “The Chain of Failures That Left 17 Dead in a Bronx Apartment Fire,” uses a first-of-its-kind multimedia approach to give readers a more comprehensive understanding of the issues and their impact.

Glanz asked WPI experts to create a virtual smoke flow model—critical to understanding how and why this tragedy occurred—to provide insights and information that could possibly help prevent future tragedies. The team conducted a number of tests using data and 3D modeling of the apartment building provided by *The Times*.

“We often work to help media with fire-related stories, but this collaboration with *The New York Times* is very different. This was a shift from providing expert opinions and insights to really getting into the weeds of what happened and trying to get the details and provide the right scenarios and answers to their questions,” says Albert Simeoni, head of WPI’s Fire Protection Engineering Department, who led the university’s research for the report.

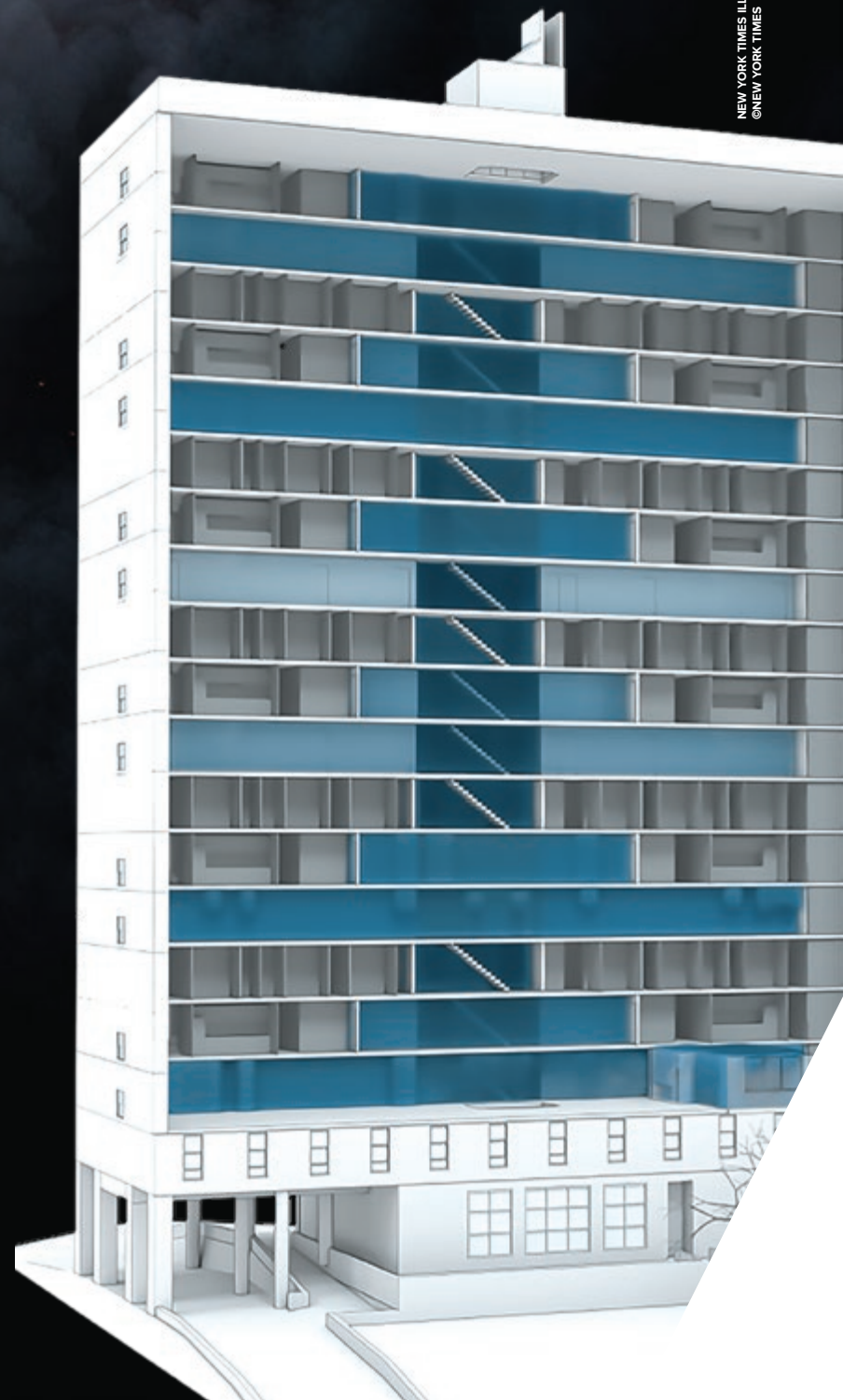
“Our contribution here was to help *The Times* make people aware of this problem, why it happened, how it happened, hoping that we’ll find the solution for it to not happen again,” Simeoni says. “This partnership created a magnificent opportunity for WPI to carry out our mission of going beyond just understanding an issue to working collaboratively to use that knowledge to help address a real-world problem impacting society.”

Muthu Kumaran Selvaraj, the WPI postdoctoral fellow who created the smoke simulation models and spent hours analyzing and documenting the smoke flow, understands the potential global impact of this report and feels a personal interest in this work.

“Back in my country of India, we don’t have many sprinklers or smoke direction systems, and in individual houses or apartments we don’t have any fire protection systems,” says Selvaraj. “I would like to see the research I did benefiting something for society. If it helps humanity to understand better the phenomena, if it helps improve the building code and the systems, that keeps me enthusiastic to do these things.”

Simeoni adds, “What we want, at the end of the day, is to be useful to society. The work we did with *The New York Times* was outside of our usual workload, but that’s where we feel very useful. And that’s the role we should play as an academic institution.”

—Colleen Bamford Wamback



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DEVELOPING ‘LIVING’ LOW-COST CONSTRUCTION MATERIAL

NSF GRANT ADVANCES SELF-HEALING CONCRETE RESEARCH

WPI researchers Nima Rahbar and Suzanne Scarlata have received \$692,386 from the National Science Foundation to improve and develop new functions for their Enzymatic Construction Material (ECM), a “living” low-cost, negative-emission construction material they created to address one of the largest contributors to climate change—concrete—by providing what they refer to as “a pathway to repair or even replace [traditional] concrete in the future.” Rahbar, associate professor of civil, environmental, and architectural engineering, and Scarlata, professor of chemistry and biochemistry, have already made their research available for commercial use through a start-up called Enzymatic, Inc.; this new funding will also allow them to:

- explore new avenues for ECM’s use, including repairing cracks in different types of glass, such as eyeglass lenses, cell phone screens, and car windshields.
- develop a program to educate diverse populations of underprivileged girls—in Worcester and in Africa—about engineering and construction.

According to Statista, between 1995 and 2020 worldwide cement production jumped from 1.39 billion to 4.1 billion tons, making it the second-most widely used substance on Earth, next to water. In addition to their efforts to help mitigate the massive climate change impacts created by concrete, Rahbar and Scarlata plan to use the new funding to refine and optimize ECM and the processes to create it, and expand its use to different materials.

Biological enzymes are catalysts that drive chemical reactions. ECM is made through a process involving an enzyme known as carbonic anhydrase—found in all living cells—that has the unique ability to react with CO₂ to rapidly remove the greenhouse gas from the atmosphere. This reaction creates calcium carbonate crystals, which serve as ECM’s main ingredient. A sand slurry is also added, as well as a polymer, which holds the ECM together during its early stages, much like scaffolding does during the construction of a building. Through this process, ECM can “heal itself” and fix cracks or other imperfections that may develop over time, retaining its strength through as many as six self-healing cycles.

In addition, the grant will allow Rahbar and Scarlata to develop a program based on their lab work on ECM to educate and inspire underrepresented and underprivileged girls about engineering and construction—an industry where the gender gap is stark; according to OSHA, only 9 percent of construction workers in this country are women.

The researchers plan to partner with organizations in Worcester, including the local chapter of Girls Inc., to create summer programs and after-school programs in which girls will design a model building, make a mold for it using 3D printing, and build the structure out of ECM. Rahbar and Scarlata are also collaborating with the African University of Science and Technology to host visiting graduate students at WPI and conduct additional summer programs for this group.

—Jack Levy

QUOTABLE

“Success looks very different to everyone. My expectations for myself and academics have changed to better meet my wellness and my academic success. Do not compare yourself to others. Instead, talk to others. Chances are people are having difficulty with the same things you do.”

—Hailey Anderson '23, offering advice in *Gompei’s Guide*, a student-written guide to help incoming students find their way at WPI and to provide them with tips and tricks to make the most of their college experience.

See how WPI students put theory into practice through projects.



ADDRESSING REPRESENTATION IN VIDEO GAMES



Acclaimed author and activist James Baldwin once said, “Not everything that is faced can be changed, but nothing can be changed until it is faced.” It’s a maxim WPI Associate Professor of Teaching **Farley Chery** infuses into his project Rigs of Color, a website

containing a diverse set of characters with a wide range of racial and ethnic identities for game developers and animators to use in their work. With Rigs of Color, Chery is working to create lasting change in the video game and animation industries—by facing its lack of representation of non-white people head-on.

“The goal is to have people of color included in representations of humanity, the real humanity,” he says, “so that all the different types of people can be shown in every light and so that they can be seen in every story.”

Chery and a team of WPI undergraduate and graduate students are designing what the industry calls rigs. In simple terms, rigs are akin to scaffolding in construction or to the bones and muscles in the body—animators use them to generate life and movement. The rigs are created through a multistep process that can involve motion capture and rotoscoping—tracing over the live-action captures, frame by frame.

The seeds of the idea for Rigs of Color first came to Chery in the early 2000s when he was a student and was unable to find rigs of non-white characters. When an undergraduate student approached Chery in 2019 asking where he could find Black characters for his animation project, Chery says he realized, “This has been a problem for a long time, and I have all the skills to fix it.” The project work has been beneficial to white students as well, who, Chery says, have learned to recognize their implicit bias and have become more versatile as artists.

Chery also says he believes the murder of George Floyd in May 2020 was the catalyst that changed people’s minds and made them see the importance of Rigs of Color and the need for representation. As he says,



“The death of George Floyd made people listen to what people who look like me have been saying for years.”

An example of that new attention came after Rigs of Color was publicly announced in the summer of 2022. Chery received interest and support from animators in the industry at well known companies, who reached out to him through social media and email. Those professional animators have offered to help spread the word about the project, as well as lend a hand with testing.

Right now, there are more than 30 characters on the Rigs of Color website, a milestone Chery says was made possible by funding and support he received from WPI. He also received funding from the Public Interest Technology University Network—a partnership of dozens of universities that’s designed to create a new generation of civic-minded scientists who will use technology to serve the public and the greater good. He is working toward creating 1,000 characters, so that there will be an average of 10 characters for most major racial and ethnic groups.

—Jack Levy

RENEWABLE ENERGY IN THE ROCKIES

THE STUDENTS: Brian Fennell, Kohmei Kadoya, John Matthews, Patrick Nieman, and Ron Pfisterer

THE ADVISORS: Leslie Dodson and Ingrid Shockey

THE CHALLENGE:

The Estes Park YMCA campus in Colorado, an 860-acre family-oriented resort with an emphasis on ecotourism and nature, is the world’s largest YMCA center and is owned and operated by the YMCA of the Rockies. As part of its sustainability goals, the Estes Park Center wishes to reduce its reliance on fossil fuels and begin generating renewable energy on site. The aim of this project was to support this goal by conducting a feasibility study of renewable energy at the Estes Park campus.

THE GOALS:

Understand how renewable energy infrastructure could impact the experience of the YMCA campus; assess the advantages and disadvantages of wind and solar sources with evaluation frameworks that combined the technical, financial, and social feasibility findings; evaluate the spatial, meteorological, and logistical conditions at the YMCA of the Rockies at Estes; compile the data and recommendations into interactive and compelling deliverables that the YMCA could use to create and advance plans for renewable energy.

THE APPROACH:

The team created a paper-based survey conducted in person near the center of the campus to guests and staff using a sample of convenience. They also conducted numerous in-depth, semi-structured key informant interviews with YMCA executive leadership and staff members across several departments, using a snowball sampling strategy. They also solicited perceptions of the feasibility and potential challenges of implementing renewables on the campus.

The team took a broad approach to its site assessments to identify potential locations on the YMCA campus for installation of solar, wind, and micro-hydro infrastructure. After finding solar power to be most appropriate for the location, the team conducted a detailed technical analysis of the year-round energy potential and short- and long-term costs of panel installations. Infrastructure measurements and qualitative assessments were compiled into a SWOT (strengths, weaknesses, opportunities, threats) analysis to determine feasibility trends.

RECOMMENDATIONS:

The findings support an opportunity for the YMCA to consider solar panel installations in the near future.

- The YMCA should pursue a pilot program with solar panels on one building. This program would be a lower-cost way to begin generating renewable energy and would allow the YMCA to obtain more accurate data on energy output, costs, and guest and staff perceptions before proceeding with a larger solar installation.
- The YMCA should foster engagement and improve education among guests, staff, and donors with regard to sustainability. A committee should develop programs such as an educational speaker series, staff listening sessions, and an expanded scope of continually updated posters and infographics highlighting progress in sustainability.
- The large 3D-printed relief map created by the team can visually communicate current and future renewable energy installations. The map is accompanied by infographics explaining current and prospective YMCA sustainability and renewable energy efforts.
- The YMCA should fund internal and external grant programs. An internal grant program would allow individual staff members to apply for funds to implement small-scale improvements related to sustainability and other topics. The Estes Park Center could also follow in the footsteps of the Snow Mountain Ranch YMCA and use the funds to support charitable causes in the local community.

WORLD ACADEMY OF SCIENCE HONORS SOBOYEJO

The World Academy of Sciences (TWAS) has named Interim President **Winston “Wole” Soboyejo** to its Class of 2022 Fellows. The honor, which TWAS refers to as the “apex of scientific achievement,” is bestowed on scientists who have made significant contributions to the advancement of science in the developing world.

Soboyejo, an international scholar, professor of mechanical and aerospace engineering, and respected materials scientist and engineer, is one of 53 fellows from around the world to be elected to this year’s class and one of only two from the United States. In total, TWAS has 1,192 elected fellows representing 108 countries, 11 of them Nobel laureates.

Soboyejo was also recently named a Fellow of the Nigerian Academy of Engineering, an institution for the promotion of excellence in engineering training and practice to ensure the technological growth of Nigeria. Its fellows represent senior Nigerian engineering professionals—living in Nigeria and abroad—who have distinguished themselves in business, academia, and government. Soboyejo is not the first member of his family to be named to this list; his father, Alfred Soboyejo, was elected a Fellow in 2020 and nominated his son for this year’s class, making the Soboyejos the first father-and-son duo in the Academy.

“Engineering and science are critical for helping address the great problems facing people in the developed and developing world, so it is an especially great honor to be recognized for not only my work as an engineer, but as a scientist, too,” says Soboyejo.

—Colleen Bamford Wamback



DEAN JACKSON RECOGNIZED WITH HARRY G. STODDARD PROFESSORSHIP

Debora Jackson, dean of The Business School, was recently designated the Harry G. Stoddard Endowed Professor in Management, named for the longtime president of Wyman-Gordon, a Worcester manufacturing company with historical ties to WPI. Stoddard was a recognized community leader and talented industrialist whose 60-year influence left a legacy of accomplishment in the greater Worcester community.

“Because of who Harry G. Stoddard was to the Worcester community and WPI, I am incredibly proud to hold the professorship that bears his name, and I am committed to carrying this honor with distinction as I serve my beloved alma mater,” says Jackson.

In addition to this endowed professorship, the Stoddard Charitable Trust has supported the creation, renovation, and/or endowment of several WPI buildings and initiatives, including Stoddard Complex, Stoddard Laboratories, Higgins Laboratories, the Worcester Community Project Center, the Laurie A. Leshin Global Project Center, and Unity Hall.

Before joining the faculty, Jackson, who holds master’s degrees from WPI in both manufacturing and management, held leadership roles in technology companies, and managed the growth of large and small nonprofits.

—Steve Foskett



MORSE NAMED DEAN OF STUDENT WELLNESS

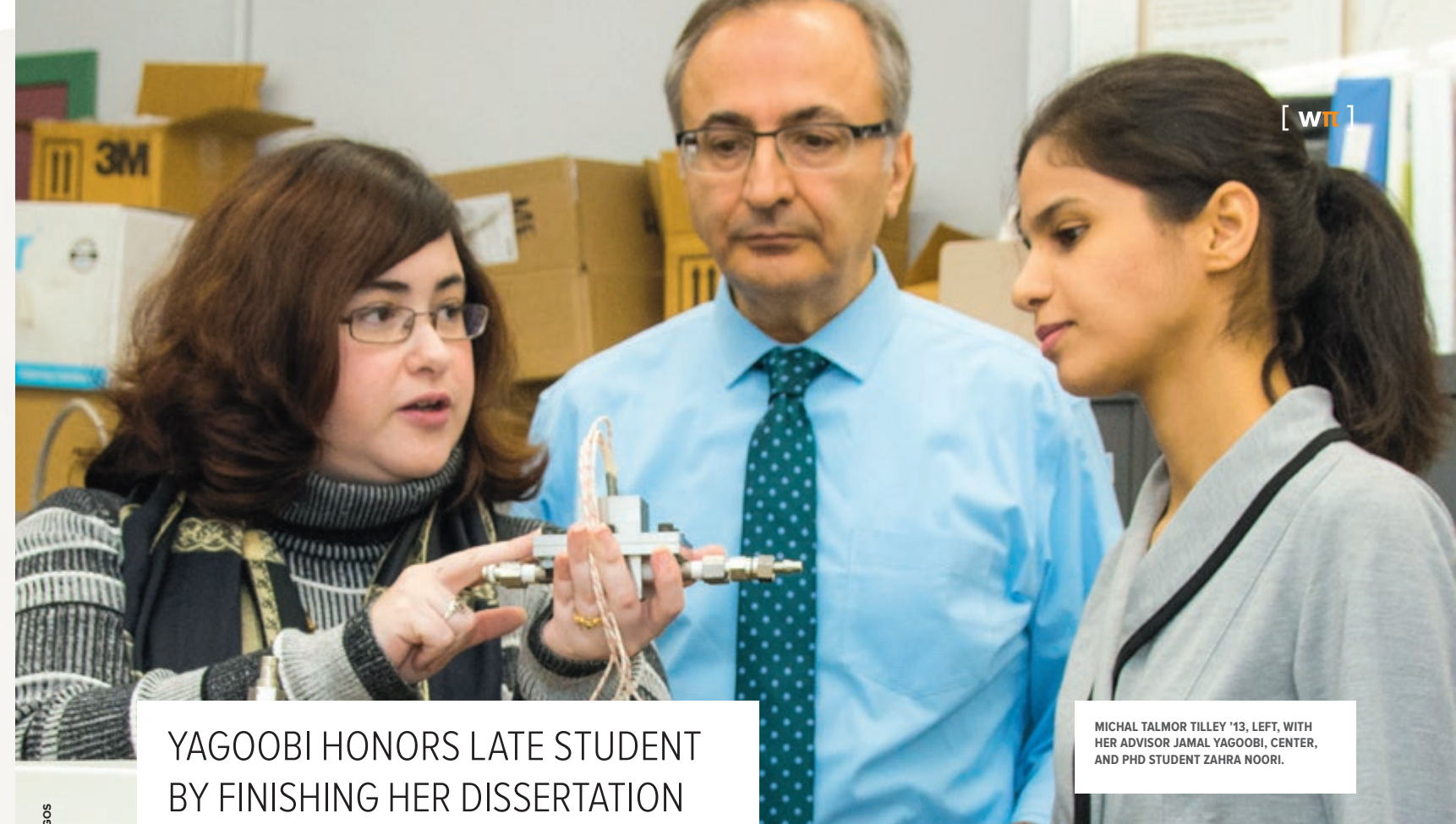
Charlie Morse has been appointed dean of student wellness, a position created to align the university’s holistic vision and its resources for health and well-being on campus. Morse was previously associate dean and director of counseling in the Student Development and Counseling Center (SDCC). He will provide leadership and support for Student Health Services, the SDCC, the Office of Accessibility Services, and the Center for Well-Being.

In his new role, Morse will ensure that the mission and goals of each independent office flow smoothly to provide students with coordinated and collaborative support. He will report to Philip Clay, senior vice president for student affairs, and will work closely with student-facing departments and academic leadership across campus.

He will lead the ongoing development of campus wellness approaches, encompassing empathic and compassionate care and support for a diverse student population through prevention, education, and outreach in partnership with departments and offices including Student Affairs, Academic Affairs, and the Office of Diversity, Equity, and Multicultural Education.

He will also identify emerging trends relating to student wellness, including student health, mental health, and disability support, with a particular eye on how student wellness impacts the individual college experience, as well as the community as a whole. He will oversee service improvement initiatives including the opening of WPI’s new Center for Well-Being and new space for Health Services and Counseling.

“With data indicating that, nationally, the prevalence of student mental health issues is over 50 percent, we need to recognize that student distress is a population-based concern, and we need to develop strategies and interventions that reflect this understanding,” says Morse. “Everyone at WPI has a part in making the campus community more supportive and responsive to our mutual well-being. I’m excited to be in this new role supporting WPI campus community health, with the new Center for Well-Being as a catalyst for change toward wellness for everyone. We will all benefit from living, learning, and working in a campus environment that values community wellness.”



MICHAL TALMOR TILLEY '13, LEFT, WITH HER ADVISOR JAMAL YAGOABI, CENTER, AND PHD STUDENT ZAHRA NOORI.

YAGOABI HONORS LATE STUDENT BY FINISHING HER DISSERTATION

When WPI graduate student **Michal Talmor Tilley '13** died suddenly of a medical condition in 2021, she left behind grieving loved ones and an unfinished project—her dissertation.

Jamal Yagoobi, her PhD advisor and the George I. Alden Professor in the Department of Mechanical and Materials Engineering, decided he would not let her research into electrohydrodynamics (EHD) go unrecognized.

“I had known her since 2013, and I felt responsible for her work,” Yagoobi says. “There was no question that I would do this. I wanted her work to be in the scientific literature under her name.”

Now it is. In May 2022, Yagoobi presented Talmor Tilley’s dissertation, “Study of Small Scale EHD Driven Flow Distribution Control and Understanding of the Effect of Temperature on EHD Conduction Pumping Performance,” and WPI posthumously awarded her a PhD in Mechanical Engineering.

The 132-page dissertation shines light on a critical aspect of research in Yagoobi’s lab—the role that temperature plays in a process used to cool down electronics. The dissertation also includes poignant tributes from current and former graduate students who worked alongside Talmor Tilley in Yagoobi’s lab and recalled her as intelligent, kind, funny, helpful, and passionate about science.

“The knowledge she imparted on me will remain with me for the rest of my life, and I am forever grateful for the time I was able to spend working with her,” graduate student Nathaniel O’Connor wrote.

To finish Talmor Tilley’s work, Yagoobi first turned to her laptop computer, only to find that she had encrypted her research data and dissertation drafts, rendering them inaccessible. He then dug into years of drafts and data he had stored while advising Talmor Tilley, articles they co-authored in scientific journals, and a recording of a video call he had held with her before she died.

“In the end, I made very few changes to what she had written,” Yagoobi says.

Talmor Tilley was a native of Israel who loved puzzles as a child and taught herself English by watching Star Trek on television. She arrived at WPI for undergraduate studies in 2009 with her cat, Chicha, and graduated in 2013 with a BS in Aerospace Engineering and Robotics Engineering. She continued her graduate studies at WPI, was awarded a NASA fellowship, married Alex Tilley '12, and became a United States citizen. In 2016, *Aviation Week* named her to its Twenty20s list of students making a difference through academics, research, and engagement with the world.

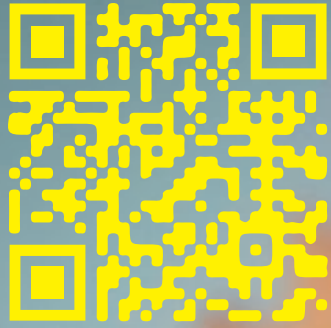
During the final year of her PhD work, Talmor Tilley left WPI to work for Aurora Flight Sciences. She was 35 when she died.

An experiment in Yagoobi’s lab is expected to fly into space in the future with a logo that Talmor Tilley designed. Her family hopes to visit WPI in the future for the dedication of a plaque in Talmor Tilley’s honor, Yagoobi says. Meanwhile, he has sent them a copy of her completed dissertation.

“Michal had a dream since her childhood,” her parents, Ron and Shoshana Talmor of Israel, wrote in an email. “She left her homeland to accomplish her dream at WPI. She will remain in our memory and hearts, talented and young forever. Fly, Michal, with your dream to space.”

—Lisa Eckelbecker





A PIECE OF HOME AWAY FROM HOME

On move-in day in August, our photographer caught up with a few first-year students who took a minute amidst the rush of the day to share the pieces of home they brought with them. Scan the QR code at left to find out what these items represent.



PHOTOS BY MATTHEW BURGOS

[WPI]

EUGENA CHOI '24 PURSUES A PASSION FOR THE ENVIRONMENT

When it comes to her path in life, both academically and personally, **Eugena Choi** is a product of her environment—literally.

“Growing up, I always liked being outside in nature, which kind of naturally led to my being passionate about the environment,” she explains. Her interest in pursuing that passion was kick-started in a high school classroom, where she took AP Environmental Science as a junior. “I immediately bonded with my teacher, and she really cultivated my interest in turning what I loved into a potential career.”

That interest led her to WPI, where she’s double majoring in environmental and sustainability studies and environmental engineering (as well as minoring in international and global studies). Though her passion for the environment and sustainability isn’t limited to the classroom, she incorporates her interests into her roles in the Korean Student Association, WPI’s chapter of the American Academy of Environmental Engineers and Scientists, and the Society of Asian Scientists and Engineers (SASE).

“They provide a safe space and a great community on campus,” she says of all the organizations. “It’s not just a space that provides professional opportunities and connections, but one to gather and socialize. I love the people I’ve gotten to know through them.”

“A Positive Light Next to Me”

The influence of teachers has been consistent in Choi’s life. William San Martin, assistant professor of global environmental science, technology, and policy, has helped her build upon her environmental interests since her arrival at WPI.

After taking two of his classes, Choi kept in touch with San Martin, whom she describes as having been instrumental in her academic process at WPI. “He’s provided a lot of advice and mentorship, as well as helping me find and navigate various research opportunities,” she says. “He’s been such a positive light next to me, and I’m really grateful and appreciative of him.”

In addition to offering guidance and a listening ear, San Martin invited her to help with his research project on global nitrogen. While the myriad experiences she’s had over the course of her high school and college years may have broadened in scope and intensity over the years, they—and, in turn, her teachers—have been invaluable in helping her craft her passions and her future.

“If it weren’t for them,” she says, “I really wouldn’t be where I am right now.” And where she is right now is more than impressive.

Research Work Close to Home and Studying Green at Brown

In 2021 she earned a Summer Training in the Arts and Sciences (STAR) fellowship award, where she completed a project (advised by San Martin) focused on environmental justice issues in Los Angeles County and how the COVID-19 pandemic amplified those problems.

“I wanted to choose somewhere that was a big city, had a history of environmental justice, and was heavily impacted by COVID-19,” she explains of her decision to study Los Angeles in particular. “LA has a history of hazardous waste sites, and communities have settled around them disproportionately, which has affected lots of pre-existing problems like air pollution and vaccine equity.”

Because of restraints due to the pandemic, Choi’s entire project was completed virtually. That aspect could have been seen as an additional challenge, but Choi used it as an opportunity to further shape her research and time management skills, making for an impactful, successful project. Both are skills she plans to utilize during her IQP, which she’ll complete in Ecuador this upcoming D-Term. Next up for Choi was the Leadership Alliance Summer Research Early Identification Program (SR-EIP), which gives students the opportunity to complete in-depth training and research work in anticipation of upcoming applications to competitive PhD programs. She spent nine weeks at Brown University this past summer, studying under Professor Scott Frickel, to explore the history and political ecology of manufacturing waste in Rhode Island during the mid-1800s to mid-1900s, as well as the environmental hazards posed by those materials, before presenting her work at the Leadership Alliance National Symposium with more than 500 of her fellow students.

“It was the first time they’d held it in person because of COVID,” she says, “and I appreciated the opportunity to be able to explain my work, share my methodology, and go in-depth into the work we had done all summer.”

Building Sustainable and Just Communities

When asked about her future and what she plans to do after WPI, Choi is open to ideas. Going immediately into the sustainability field after graduation, getting her master’s or MBA in a field related to sustainability, or spending some time working before returning to school are all viable options. But no matter what she does, she plans to spread the word about the importance of environmental sustainability and careers in the field, an effort that began right here on Boynton Hill through the first-ever Careers in Sustainable and Just Communities Networking Event.

“There aren’t many of us majoring in Environmental and Sustainability Studies,” she says. “[Co-student organizer Hannah George ’24] and I met and connected because we’re the same major, and sometimes it felt like we were the only ones in the program.

“Because of that, we were able to connect with our professors and faculty mentors really quickly, and we wanted to advocate for the program together. We all want to keep improving it, and we just naturally ended up joining them and contributing our voices on how to do so from a student perspective.”

Regular committee meetings with faculty about how to share what the program has to offer with the rest of the campus community led to Choi’s and George’s realizing that many students had an interest in sustainability and related ventures even if they weren’t majoring in it. They used that knowledge to work with Associate Professor of Teaching Lisa Stoddard, Michelle Mestres ’19, and the Career Development Center staff to welcome 30 climate-focused alumni and employers—in professions ranging from environmental engineers and environmental lawyers to entrepreneurs—to connect and share their experiences with students in a more relaxed, informal atmosphere.

“We ran out of places for people to sit,” Choi says with a smile. “Working with our faculty mentors, seeing everyone come together, sharing our passions with each other ... it was all just really fulfilling.”

—Allison Racicot

INSIDER

PHOTO BY MATTHEW BURGOS

Paul Reilly, assistant dean of student success,

leads the advising team that helps WPI students take advantage of the many academic opportunities available to them. He piloted the First-Year Welcome Experience, a new program for incoming students that emerged from work by the Mental Health Implementation Team.

What's the First-Year Welcome Experience all about?

The FYWE was an opportunity for us to enhance one of the most important characteristics of WPI—connection. Students and families are seeking an environment where relationships are put at the forefront of the learning experience. This summer we welcomed more than 1,000 students and their families to campus to participate in programming that connected them with their peers, student leaders, academic advisors, and faculty and staff across the institution. We held 10 different sessions over two weeks, including online sessions for students who couldn't make it to campus. The feedback we received from students and families was overwhelmingly positive. WPI is an innovative place where everyone in the community has an opportunity to try things. I am delighted that our collective effort to try something new yielded such a valuable experience for new students.

Why do you include parents in this program?

As a parent myself, I know I want to see my children have the best opportunities available to them. At WPI, we truly value parents as partners in helping educate students holistically. The FYWE allowed us the chance to put this into practice. We developed a day-long series of connection experiences where parents were able to meet with staff and faculty. We received lots of great feedback about their experience, including this: "We loved every aspect of our day, and we are so excited for our son to attend WPI! Participating in the first-year experience really demonstrated how well the culture and academic structure are such a wonderful fit for our son." And one of my favorite quotes: "I finally understand what a 1/3 credit is!"

What feedback have you received from incoming students so far?

Student feedback about the FYWE has also been very positive. One student wrote: "I already made three friends in my incoming class and even though we didn't have much in common, we all just vibed with each other really well and had so much fun!" The transition to college can be challenging for students (and families), so to hear these words brings me a lot of joy. The FYWE marked the kick-off for new students and families, but we have also redesigned a number of our other experiences to make the first year a positive one. This included changing the course registration process to

reduce stress for students, and also awarding PE credit for the Insight program. These changes have been welcomed by students and we believe they will have a positive impact in their first year.

How do you balance the high academic standards of both students and faculty with the potential for mental health challenges?

Our students are incredibly dedicated. They are focused on doing well academically, in their clubs and activities, in their sports, in their jobs—you name it. Leveraging this dedication to ensure that students are also dedicating the time to take care of themselves and others is something we are paying a lot of attention to. WPI is a rigorous academic institution where students get a world-class education. There is also a lot more to it. The WPI experience is about developing relationships, taking on leadership roles, increasing independence, and so much more. We are working to ensure that students are supported through this academic journey by our faculty and staff, who care about their well-being.

What excites you about your job?

So much! I have been at WPI for 10 years and I am always amazed by our students. I am fortunate to work with students on a daily basis and feel spoiled to be a part of their experience. I love hearing about students' Interactive Qualifying Project experiences, their involvement in clubs, business ideas they have, and generally how they're doing. I also get to work with an incredible team in Academic Advising who care so much about students. There have been so many positive changes at WPI since I started working here, including the new Unity Hall building where the Advising Office is now located. It's a great community to be a part of.

What might someone be surprised to learn about you?

I am originally from Ireland and love to get back to visit whenever I can. My wife, Stephanie, competed at the 2012 London Olympics in track and field—we have been involved in the sport since we were kids. We are still heavily active in track—coaching adults through Central Mass Striders and our kids' running club, Edge Elite Track Club. Both our older kids also compete, so it is nice to be still involved with a sport that we grew up doing.

PHOTO BY MATTHEW BURGOS



A BIG IMPACT DOWN UNDER

Aside from kangaroos, koalas, and the Outback, one of the first things people associate with Australia is that everything there is big. The continent itself, the Great Barrier Reef, the spiders and other critters that may sneak their way into your home (or, worse yet, shoes), and, of course, the Big Things themselves (just Google “Australia Big Things”).

So it’s only fitting that the impact WPI students have there is big, too.

Established in 1998, the Melbourne, Australia, Project Center gives WPI students the chance to immerse themselves within the city of Melbourne and across the state of Victoria while working on a wide variety of projects. It’s one of WPI’s most popular project centers, quickly growing from being offered two times per academic year to three—B-, C-, and D-Terms—which allows for the completion of 18 projects per year. The project center will be celebrating its 25th anniversary in 2023.

Currently co-directed by **Lorraine Higgins**, teaching professor in The Global School, and **Stephen McCauley**, associate professor of teaching in The Global School, the center was founded by **Jonathan Barnett**, a former professor of fire protection engineering who used his firefighter and other emergency services contacts to offer projects in that particular sector. Since then, the center has branched out considerably, working with nearly 50 Melbourne partners on projects involving everything from emergency services and family support to urban planning, bio-energy hubs, research on microplastics pollution, and promotion of alternative energy sources.

“I think that’s what makes us unique,” says Higgins, who began co-directing the center with McCauley in 2016. “Many centers focus on one or two themes, but we have touched on a diversity of global problems through our work with government agencies, charitable organizations, and even the private sector; our work sometimes brings together different sectors that can collaborate effectively and move research straight into policy making.”

She notes the many studies of microplastics in waterways have influenced Victorian policy, with the government now recognizing this type of pollutant. Clean water advocates in other countries are also beginning to use some of the

innovative sampling techniques and citizen science methods coming out of the project center.

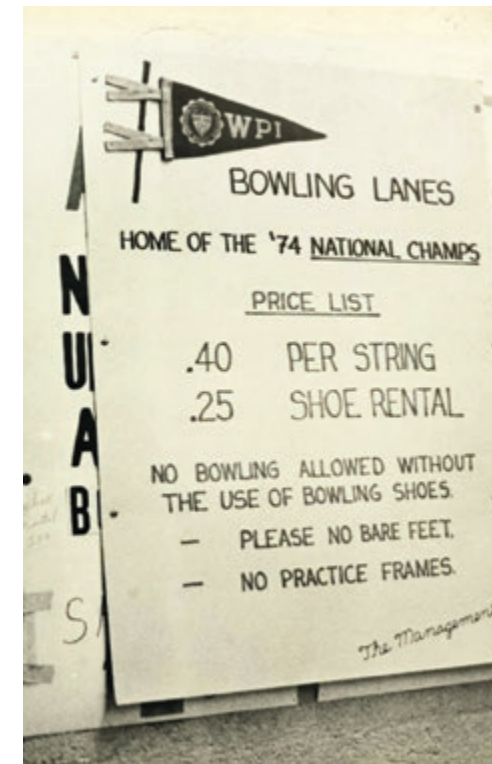
“It’s important to us not to just walk in, do the work, and leave,” McCauley says, adding that in the past, local Melbourne sponsors have been able to take pieces of student work over time to build new organizational practices. “Our series of projects on the mental health of emergency service workers, for instance, is leading to new support services for volunteers in the sector. We’ve been able to foster connections that lead to real change, and our students have utilized those relationships to put their work into action while being challenged and stretched in their own lives.”

The opportunity to do just that is what appealed most to **Gabrielle Tims ’23** when narrowing down her project center options. “I’ve never traveled very far, and I really wanted to step out of my comfort zone,” she explains. “The fact that I would be living there for a longer period of time while working with the community made it a perfect opportunity.”

Tims and her team worked with their sponsor, the Brotherhood of St. Laurence, to help bridge the gap between disadvantaged young people seeking employment and manufacturing and agricultural companies looking for employees. Through focus groups and interviews with employers, the team developed an online tool to help young people (many of whom are unable to pursue higher education or come from refugee backgrounds) in their job searches.

“I definitely learned what working professionally is truly like as opposed to what I’m used to in taking college courses,” she says, adding that through her team’s work, she was able to refine her presentation skills, better host meetings and interviews, and more effectively manage her time. “Being the one who was from a different country for the first time and working with young people who are not from a background similar to mine also put my perception of the world into a new perspective.”

—Allison Racicot



The 1974 Championship Bowling Team

While WPI boasts two NCAA national championships (Women’s Varsity 8 rowers in 2022 and golfer Eric Meerbach ’87), a different type of sports team captured another national championship for the university—a team that had no official coach or even uniforms. Competing in the Tri-State College League in 1974, the WPI Bowling Team defeated the United States Military Academy in the last match of the season to dramatically secure the conference title via percentage points, 0.620 to 0.613. They then competed in the Eastern Intercollegiate Bowling National Championships before moving to the national championships in Gainesville, Fla.

The Technicians, as they were known, were composed of six students: Gary Anderson ’76, Tom Burns ’74, Gary Gastiger ’74, Jack Germaine ’76, Randy Emerson ’76, and Ed Karedes ’75. The team practiced at the campus bowling alley in the lower level of Alumni Gymnasium, called Gompei’s Gutters, relying on self-coaching and their own encouragement.

Opened in 1962 during what many consider the Golden Age of ten-pin bowling, the campus bowling alley was a popular recreational activity spot for bowlers of all skills. The team’s unlikely victory was even covered by *Sports Illustrated*, which noted that when news of the Technicians’ victory reached campus, reporters were met with a near-unanimous response from students: “What bowling team?”

While there is no longer a bowling alley on campus, the memory of the many hours WPI students spent in Gompei’s Gutters is memorialized on the outside wall of Harrington Auditorium, thanks to one particular grotesque.

—University Archivist Arthur Carlson, assistant director of George C. Gordon Library

THE ARCHIVIST



CLOCKWISE FROM TOP LEFT: THE MANAGEMENT OF GOMPEI’S GUTTERS MADE SURE THE 1974 BOWLING TEAM RECEIVED PROPS FOR ITS NATIONAL CHAMPIONSHIP; MEMBERS OF THE TEAM WITH THEIR MANY AWARDS; ONE OF THE HARRINGTON AUDITORIUM GROTESQUES MEMORIALIZES THE FORMER BOWLING ALLEY.

Yan Wang

THE WILLIAM SMITH FOUNDATION DEAN'S
PROFESSOR OF MECHANICAL ENGINEERING

PHOTO

This photo is a gift from my students. When I received tenure a few years ago, the students prepared this gift and each of them wrote some nice words.

VIAL

My major research is to develop materials for electrochemical devices (batteries) to power portable electronics, electric vehicles, and energy storage. The black powder in the vial is the cathode materials synthesized in my laboratory at Washburn Shops.

NAME TAGS

As a faculty member, I often go to different conferences to present our research. I have collected about 100 name tags in my office.

PHD THESIS

My PhD work involved developing metallic bipolar plates for PEM fuel cells. However, after I finished my PhD work, there was less opportunity on fuel cells so I switched to working on lithium-ion batteries. The fundamental background for both fuel cells and batteries is electrochemistry, which is my undergraduate major.

COIN CELLS

This is one of the coin cells that my group uses to test the electrochemical performance of synthesized battery materials. Each year my group assembles and tests 5,000-10,000 such coin cells.

BATTERIES

The cathode materials in these lithium-ion batteries are made from recycled materials. My group is a pioneer group working on lithium-ion battery recycling, and we have successfully developed a closed-loop process. The technology is licensed to Ascend Elements, which is one of the major lithium-ion battery recycling companies in the nation.

PHOTO BY TODD VERLANDER



FACULTY SNAPSHOT

Get to know faculty through items they have in their offices.



THE EYES HAVE IT

Orts, the esports club's goat mascot, looms large on the wall of the esports lounge of the new South Village Student Center, located a short 10-minute walk from the Quad. The former Becker College building, which opened this fall, also includes a café, a dining hall, a half-court gymnasium, student office space, and common areas for socializing. South Village also includes nine residence halls that house 216 students.

PHOTO BY MATTHEW BURGOS


SENSE OF PLACE



ensing the Living Breath

Electrical engineer Ulkuhan Guler has an ambitious goal: creating a small, smart, skin patch that collects critical measures of respiration.

BY MICHAEL DORSEY
PHOTOGRAPHY BY SCOTT ERB



Ancient Greeks thought all diseases were the result of imbalances in four bodily fluids, or humors: yellow bile, black bile, phlegm, and blood. Medical practice has advanced greatly since then, but when it comes to understanding and diagnosing disorders of the cardiovascular system, modern doctors still look to a small set of vital signs: pulse, blood pressure, respiration rate, the partial pressure of oxygen and carbon dioxide in the arteries, oxygen saturation, and the total oxygen content of the blood. Taken together, these parameters can indicate whether the heart and lungs are functioning normally—and if they aren't, they can show what the source of the malfunction might be.

Currently, clinicians must use multiple sampling methods to obtain this information. For example, oxygen saturation (the ratio of how much oxygen is in the blood versus how much it can normally hold) can be measured with a pulse oximeter, a device that clips to the end of a finger. But pulse oximeters can't detect when blood is oversaturated, a condition called hyperoxemia, which sometimes occurs when patients are given supplemental oxygen. In adults, hyperoxemia can lead to oxygen poisoning, which can damage the lungs and other organs; in infants, it can injure the retina and white and gray matter in the brain, contributing to blindness and cognitive impairment.

The most reliable way of measuring partial arterial pressure of oxygen and carbon dioxide, which indicate how well these gasses are moving between the lungs and the blood, involves an arterial blood draw, a painful procedure. Even in intensive care units, samples are taken infrequently—often just three times a day—which means dramatic changes can go undetected for hours. Devices exist that can measure these blood gasses noninvasively, but the technology is bulky and expensive, and some units use heaters to increase the perfusion of gasses through the skin, causing burns if the sensors are not moved frequently.

Work underway in the WPI laboratory of Ulkuhan Guler, assistant professor of electrical engineering, aims to change all that by developing a patch with miniaturized sensors and electronics that can continuously collect all of the critical measures of respiration—something no other single device can do. Worn on the skin like a Band-Aid, the patch could be used in hospitals and clinics, and even by patients in their homes. By transmitting data to physicians wirelessly, it could provide an early warning of potentially serious complications.

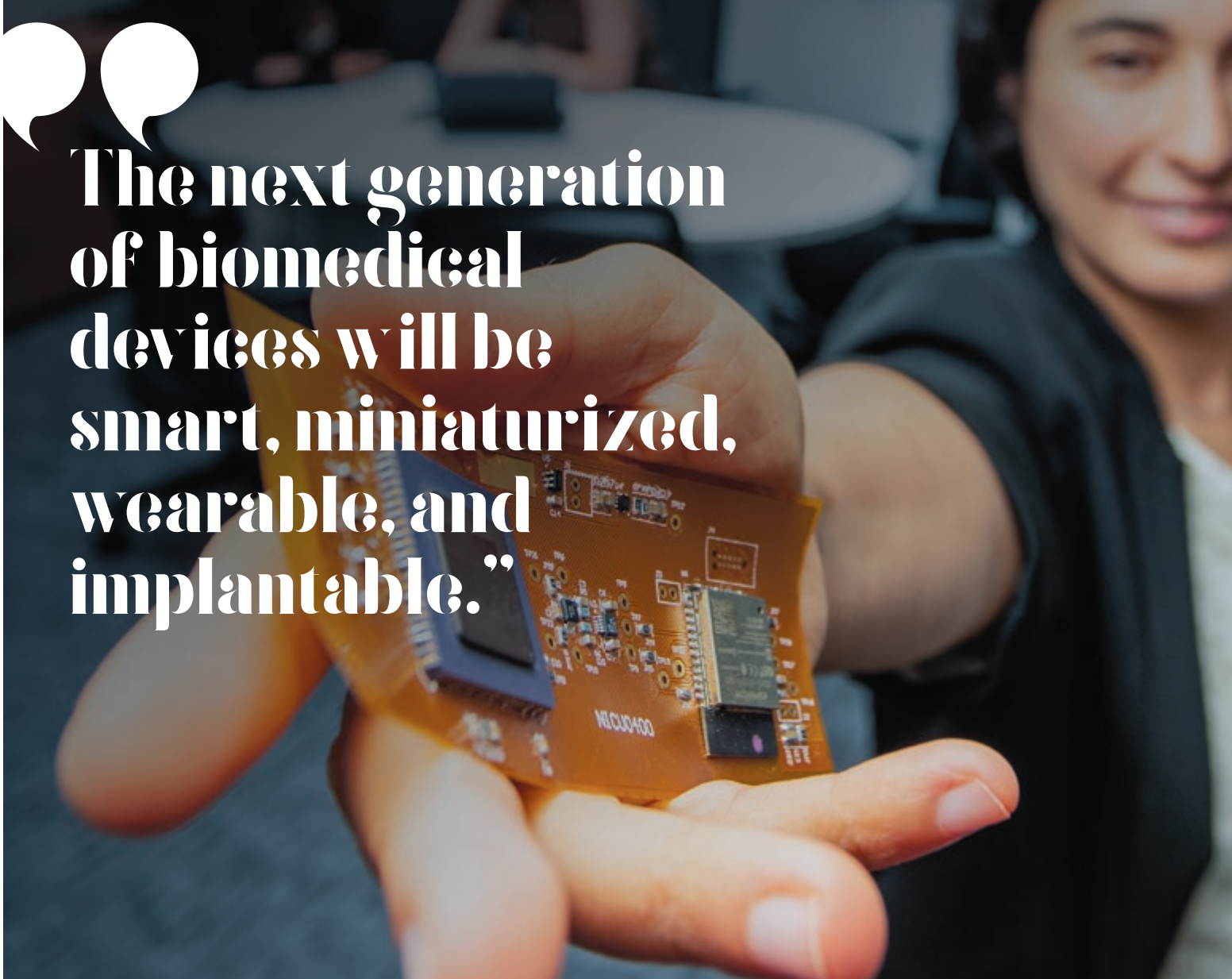
Four years into her work toward this ambitious objective, Guler and her research team still have many challenges to overcome. But their progress to date, made possible in part by more than \$1 million in federal and corporate funding, makes her optimistic that her vision of an all-in-one respiratory sensor patch could be realized in the not-too-distant future.

FINDING A NICHE

Guler, who earned a BS in electronics and communication at Istanbul Technical University, an MS in electronics engineering at the University of Tokyo, and a PhD in electronics engineering at Boğaziçi University in Istanbul, joined the WPI faculty in 2018 after three years as a post-doctoral research fellow in electronics engineering at Georgia Tech, where, among other accomplishments, she developed an application-specific chip that provides wireless power and data for implantable medical devices.

“By training, I am an electronics engineer,” she says. “I design electronic chips. But I am also interested in doing biomedical research, because the next generation of biomedical devices will be smart, miniaturized, wearable, and implantable.” Which means they will be driven by chips.

Early in her time at WPI, she learned that new researchers should seek out a focus area that builds on their previous work, but one that also blazes a new path. In search of her niche, she asked doctors at the UMass Memorial Health system what kinds of biomedical technology they most urgently needed. Among them was Lawrence M. Rhein, MD, chief of the UMass Memorial Division of Neonatology and chair of the Department of Pediatrics.



The next generation of biomedical devices will be smart, miniaturized, wearable, and implantable.”

“He told me about the importance of finding a better way to measure blood gasses,” she says. “Little babies don’t have as much blood to lose as older children and adults, and when blood is taken, the data is only of the moment. But doctors really want to observe the history.” And even when noninvasive means are used to monitor infants with respiratory distress, they must be tethered to a device in the neonatal intensive unit (NICU), sometimes for days—as Guler knows from personal experience.

Fourteen years ago, she delivered her first child, Musa, in a hospital in Istanbul. “They gave him to me for an hour,” she says, “and then they noticed that something was wrong with his breathing.” She stayed in the hospital for three days while her newborn son was hooked up to monitors in the NICU. “I could hold him for only 10 or 15 minutes at a time. I wanted to be close to him; it was so frustrating.”

Guler soon had a mission and a research partner, as Rhein has been

a collaborator on all the work done to date. “We consult him about the devices we are developing, about our experimental results, about anything related to medicine,” she says. Guler is also collaborating with Bige Deniz Unluturk, assistant professor of electrical engineering and biomedical engineering at Michigan State University, an expert on computational modeling in biomedical engineering, and with John McNeill, WPI’s Bernard M. Gordon Dean of Engineering and an expert on integrated circuits, who hired Guler when he was head of the Department of Electrical Engineering.

EARLY BREAKTHROUGHS

Developing new biomedical devices is not only technically challenging, it’s expensive. So having found her niche, Guler began applying for funding. Money from the WPI-UMass Chan Medical School Collaborative Seed Funding Grant Program and two awards from Analog

Devices, a semiconductor company in Wilmington, Mass., helped equip her lab and launch work on the development of a transcutaneous oxygen sensor. (Rhein also lent Guler instruments she uses for testing.)

The research program received a major boost with two awards from the National Science Foundation: a \$500,000 award for developing computational models for a wearable blood gas monitor for infants, and a five-year, \$500,000 CAREER award to fund work on a noninvasive miniaturized blood gas sensor for respiration monitoring. CAREER awards are the NSF’s most prestigious awards for young faculty members seeking to establish new research programs.

Guler and her team also did their homework. For nearly six months they read everything they could find on respiration, blood gasses, and methods for measuring them. “We wanted to understand,” she says, “what kind of sensing technologies are available and suitable for this research, for miniaturization, and for being used in a medical device.” The team, which included Rhein and Guler’s first two PhD students, Ian Costanzo and Devdip Sen, summarized their findings in a heavily cited paper in the journal *IEEE Reviews in Biomedical Engineering*.

The team learned that oxygen that diffuses through the skin can be directly correlated with the partial pressure of oxygen in the arteries—what existing noninvasive devices measure. Guler and her team, which now includes four PhD candidates, two master’s students, and teams of undergraduates completing Major Qualifying Projects, decided to try to measure diffused oxygen and carbon dioxide with luminescence films, which respond to light of specific frequencies. By shining blue light on one type of luminescence film, they could get it to emit red light, which is absorbed by oxygen molecules. Since the amount of red light bouncing back to the sensor would be inversely proportional to the amount of oxygen present, the intensity of the reflected light should indicate the quantity of diffused oxygen.

Guler’s team produced a series of oxygen sensor prototypes. “With the first prototype, we could see that we could sense high and low oxygen in a test chamber,” she says. “That was really so exciting. We knew it was possible, but it was the first time we had seen it with our own eyes.”

Through such laboratory experiments, they learned that monitoring intensity alone would not produce reliably accurate measurements. Better results could be obtained by capturing both intensity and decay time, a measure of how long it takes for the intensity of the reflected light to drop below a preset level. With these results in hand and the oxygen sensor advancing well, Guler has turned her attention to measuring carbon dioxide, a far more difficult nut to crack.

Similar to the oxygen sensor, the carbon dioxide sensor will use light-emitting material. She has chosen a fairly new type of fluorescence film, called a fluorophore film, because it can be integrated with the oxygen sensor in the same device. Again, as with the oxygen sensor, Guler proposes to measure both the intensity of light and the decay time. “Measuring decay time for oxygen is relatively easy,” she says, “because it is slow—in the microsecond range. But for carbon dioxide, it is in the low nanosecond range, and that is very difficult to capture.”

Guler says she and her students are exploring methods beyond decay time for obtaining accurate CO₂ readings, including measuring tiny differences in the phase of the transmitted and reflected light. They are also exploring whether the ratio of intensity and decay time may provide better information than either factor alone. “The reading method is everything,” she says. “Otherwise, we may be reading junk.”

REFINING AND DREAMING

To pack all of the components of a wearable respiration sensor into a Band-Aid-sized patch, everything needs to be small. That begins with the two luminescence film sensors for oxygen and carbon dioxide, which will be about the size and shape of the holes made by a paper hole punch. The patch will also include tiny light-emitting diodes and photodiodes for generating and detecting light, circuitry for wireless data transmission, a power source (batteries or wireless power transfer), and a tiny chip.

Integrated into the chip will be custom-designed algorithms for calibrating the sensors and processing the data they produce. Among these algorithms will be computational models that will adjust the sensor data to compensate for factors that can affect the permeability of skin, and thus the ability of oxygen and carbon dioxide to diffuse through it, including age, sex, height, and weight.

The team will also explore ways to make the patch comfortable to wear for up to a week. This and other aspects of the design will be refined through tests in the lab and, ultimately, through human trials. When the research reaches that critical point, Guler says she will likely explore partnerships with biomedical device manufacturers and also seek funding from the National Institutes of Health, which can support trials with human volunteers and actual patients. She says she will also look to Rhein for his expertise in this phase of the work.

While her focus now is on fulfilling the goals of her current NSF funding, which is limited to the miniaturized, wearable arterial oxygen and carbon dioxide sensor patch, Guler is also looking to future challenges. She says she believes the work her lab is undertaking can be extended to incorporate the other critical aspects of respiration that will help doctors diagnose and track respiratory ailments. “What I am dreaming of is a complete respiration patch,” she says. “So, we will be looking to combine the two parameters we are currently working to measure with things like oxygen saturation, respiration rate, and total blood oxygen content. This is work that will stretch beyond the five years of my CAREER Award.”

She is also thinking about the applications such a patch would make possible (beyond monitoring patients in the clinic and at home). She says she has already received interest in her research from the U.S. military, which would like to be able to wirelessly monitor the respiration of soldiers stationed at high altitudes. Guler also envisions incorporating her respiration monitor into smart watches and fitness monitors, to give healthy people more useful data on the state of their hearts and lungs. And then there are the mounds of data that a continuously operating respiration patch could produce, data that could be a boon to research and public health.

For example, she wonders whether our understanding of COVID-19 and its effect on respiration might have become clear earlier had a patch like hers been in widespread use. And she says she would like to collaborate with Rhein on researching the role of oxygen in fetal and infant development, and on the risks of administering supplemental oxygen to babies, something her technology could make possible.

But most of all, she says, she is motivated by the quest to build technology that can make life better for people around the world. “If we can create this device and make it affordable,” she says, “it could make a difference for the whole of humanity. It would be so rewarding to see the technology that we develop become useful for so many people from so many countries and backgrounds.”



A RECORD YEAR FOR CAREER GRANTS AND RESEARCH EXPENDITURES

In addition to Assistant Professor Ulkuhan Guler, three other WPI faculty members recently received the National Science Foundation's CAREER grant, which supports researchers during the early stages of their academic careers. Since 2012, 24 WPI researchers have received the prestigious award.

"The NSF awards received this past year by four of our colleagues confirm one of the defining characteristics of our institution's culture: excellence in combining research and education," says Vice Provost for Research Bogdan Vernescu. "This past academic year has not only been a record year for CAREER awards, it has also been the best year in terms of research expenditures, which surpassed—for the first time—the \$40 million mark."



MIN WU, ASSISTANT PROFESSOR IN THE DEPARTMENT OF MATHEMATICAL SCIENCES

\$450,000 CAREER grant to develop mathematical models describing how secretions and mechanical forces shape the growth of elongated plant cells

The five-year project will focus on mathematical modeling of filamentous cell wall growth, which could lead to insights about plants and fungi that impact agriculture and human health, says Wu.

"The way that filamentous walled cells grow is poorly understood, and it is challenging to observe and measure the biological activity with experimental approaches alone," she says. "Mathematical models can bridge this knowledge gap. Models could lead to a better understanding of how plant root hairs reach into soil for moisture and nutrients and how fungi that cause illness could be attacked."

Cell filaments such as juvenile-stage moss cells maintain their growth at the tip and through a process known as exocytosis. During exocytosis, materials inside a cell travel through the cell membrane and lay down deposits on the exterior of the cell.

Wu will develop two mathematical models to describe cellular activity and forces related to growth. One model will define how secretions from inside a cell and mechanical forces on cell walls influence cell-wall surface shapes. A second model will define how patterns of new cell wall materials in elongated cells regulate cell-wall thickness while under mechanical pressure. She will validate her models by comparing the predicted secretion profiles with experimental measurements.

The project expands on Wu's previous research, which has used mathematics to analyze biological processes, such as wound healing and tumor growth. She also has modeled the development of large-scale living tissues.



ERIN OTTMAR, ASSOCIATE PROFESSOR IN THE DEPARTMENT OF SOCIAL SCIENCE AND POLICY STUDIES

\$700,000 CAREER grant to develop technology that will help middle school teachers better understand when and how students are succeeding or struggling while learning algebra

Ottmar will design and develop real-time artificial intelligence tools for digital mathematics platforms so that teachers can better detect, assess, and predict the math strategies and knowledge of their students.

"It's difficult for busy teachers to quickly and efficiently identify the problem-solving strategies that students are using or failing to use as they learn algebra," Ottmar says. "It's a challenge that accelerated during the COVID-19 pandemic as many schools moved to online classes. The goal of this project is to use data mining to develop tools that will provide useful information to teachers in real time to help them better instruct and guide students."

To develop indicators of mathematical strategies and knowledge, Ottmar will use data collected during a large study from 1,300 students who played a digital math game, *From Here to There*, that uses Graspable Math technology.

Graspable Math, which Ottmar helped develop with previous funding from the U.S. Department of Education, enables students to dynamically solve math problems on a screen, such as a tablet or laptop computer, by dragging or clicking on numbers to move them around while solving problems. The technology alerts students if they make an incorrect move and logs all students' actions and mathematical steps. Graspable Math is developed by Graspable Inc. of Bloomington, Ind.

During the project, Ottmar will co-design new tools with teachers, pilot the tools in classrooms, and launch a website with free public access to the tools for students, teachers, administrators, and researchers. WPI undergraduate and graduate students, as well as teachers and students from local schools, will participate in the research.



AMITY MANNING, ASSOCIATE PROFESSOR IN THE DEPARTMENT OF BIOLOGY AND BIOTECHNOLOGY

\$1.1 Million CAREER grant to determine the factors influencing a critical piece of cellular machinery during normal cell division

The five-year project will focus specifically on histone modifications in a dividing cell and how they recruit proteins to help with the process of cell division. More broadly, the project will answer questions about a fundamental cellular process that impacts how organisms grow, mature, and maintain life.

"Proper cell division is critical for all living organisms," says Manning, "Cell division, however, must be precise and accurate. Understanding the role of histone modifications in the equal division of genetic material when a cell divides is going to have implications for all normal processes that require cell proliferation."

Manning will define the cellular mechanisms that enrich an enzyme called Suv420 on chromosomes, which are molecules in the cell nucleus that contain genetic code. Suv420 modifies a histone protein, H4K20me3, that is involved in organizing chromosomes. H4K20me3 is enriched on chromosomes near a central point called the centromere. Suv420 and H4K20me3 are thought to play a role in sorting chromosomes from a parent cell into new daughter cells and preventing chromosome sorting errors that could occur during cell division. Manning also will define the role that other histone modifications play in the composition and function of centromeres.

The project builds on Manning's previous research exploring molecular mechanisms that regulate cell division. She is working to define the role of retinoblastoma protein in cell division errors and to help develop computational models that account for the forces that influence cell division.

As part of the project, Manning will add material to her undergraduate biology courses to enhance scientific literacy among students, and she will participate in co-op and internship programs for high school students that are aimed at encouraging underrepresented populations to pursue careers in science.

—Lisa Eckelbecker and Steve Foscett



Field Work in Sustainability

DON SEVILLE '92 USES SYSTEM THINKING TO IMPROVE FARMING AND FOOD

BY SCOTT WHITNEY
PHOTOGRAPHY BY DANIELLE SYKES

With mechanical engineering and sociology degrees in hand, Don Seville was headed for a comfortable—albeit predictable—career path. The biggest decisions he faced were which major consulting firm he'd like to join, and on what tree-lined cul-de-sac he would buy his first home. A question posed by a would-be mentor changed everything.

“You can map out how people believe the world works, and then challenge them to think differently and start creating the future they actually want.”



DON SEVILLE IS A MEMBER OF THE COBB HILL CO-HOUSING COMMUNITY IN HARTLAND, VT., A TESTING GROUND FOR SUSTAINABLE LIVING.



For several years, Seville had been inundating the environmental scientist and writer Donella “Dana” Meadows with postcards and letters asking if she would serve as his mentor. Her response jarred him into an entirely unforeseen personal and professional trajectory: “Forget your work for a moment,” she wrote in reply. “How do you want to live?” Twenty-five years later, Seville’s life bears the mark of Meadows’ inquiry. He has become a new kind of engineer, bringing the discipline of systems thinking to bear on some of our most stubborn social challenges.

A GHOST IN THE SYSTEM

Don Seville has many strengths, but remaining focused on a small-scale task is not one of them—at least not when the big picture teases far more compelling questions. After graduating from MIT with a master’s degree in Technology and Policy, he found himself consulting with a major luxury-car manufacturer on how to cut product development time from 40 months to 36 months. His team was ultimately successful, but the project presented bigger questions. “I thought, ‘But what are their competitors going to do now?’” he recalls. “They’re also going to exert pressure to get down to 36 months, and then 32. What’s the point? What exactly am I working toward here?”

Early on in his academic career, Seville discovered a passion for systems thinking, an interdisciplinary approach to large-scale problems that methodically explores incentives, causal agents, and the hidden relationships between seemingly disparate elements within a system. The approach of systems thinking may be rooted in an engineering feedback control system mindset, but its theoretical framework is finding application elsewhere, including with matters of social change.

At WPI, he was first introduced to systems thinking by Michael Radzicki, a social science and policy professor who specializes in economics and system dynamics. As Seville tells it, Radzicki pulled back the curtain on what would become a lifetime of curiosity and research. “Through my IQP (Interactive Qualifying Project), I was introduced to the idea that you could take an engineering approach to understanding how systems work, but ground it in the context of people,” he says. “If you do that, you can map out how people believe the world works, and then challenge them to think differently and start creating the future they actually want.”

His research introduced him to the work of Meadows, an environmental scientist and proponent of systems thinking who believed a co-housing community built on working land would be the perfect

sandbox to test many of her ideas around conservation and sustainable living. She had her eye on 270 acres in Vermont, and Seville needed little prompting to pick up and head to the Green Mountain State to check it out. A core group of co-founders began to coalesce in 1996, and in 2000, the would-be community broke ground. Meadows envisioned an on-site think tank that used systems thinking as a mechanism for global systems research. Driven by her vision, Cobb Hill Co-housing and the Sustainability Institute were soon born on a pastoral hillside in Hartland, Vt. But in 2001, just as the first families were ready to move into Cobb Hill, Meadows died unexpectedly, leaving the group to launch without its visionary founder.

“It was very hard when the inspiring force disappeared,” says Seville. “Dana was so authentic, and could cut through conflict—now we had to bring this vision to life without a single person who could facilitate arguments and bring people together.” Over time, Seville and other community members stepped into this role, drawing on their own strengths. Though he felt he’d never match Meadows’s ability to inspire, the skills he acquired through his training as a mechanical engineer offered a method of untangling difficult problems, whether the challenge was a fair livelihood for farmers, or 20 families’ agreement on co-housing policies.


“I learned that I’m good at helping people think about what motivates other people so they can get the result they want,” says Seville. “Both in our built environment and in our social interactions, there’s a very practical engineering approach—but at its core, we found that having to work together as a community is a fantastic foundation.”

That shared work begins with the day-to-day concerns of a shared-living community: Who should we invite to be a part of this experiment? How do we heat our homes? What’s the best way to balance our needs as discrete households with the needs of the community? But the goal of Cobb Hill Co-housing was always broader: Seville and his neighbors intended it to serve as a testing ground for reproducible approaches to sustainable living. And for that broader work, the Sustainable Food Lab, of which Seville is now director, is where the rubber hit the road.

FOCUSING ON FOOD PRODUCTION

In Cobb Hill’s early years, the Seville worked with the Sustainability Institute, which cast a wide net in the global challenges it tackled through systems thinking. From the energy sector to shrimp fisheries, Seville and his colleagues took it all on, but felt frustrated with the limita-





“We may start by asking, ‘What would it take for this farmer to earn a decent living?’”

tions of a wide scope. “When you’re parachuting in from one issue to another, you gain some insights, but you’ll never understand or change the underlying relationships,” he admits.

Hal Hamilton, then-executive director of the Sustainability Institute, proposed a long-term programmatic focus on food-production systems. Through personal experience as a dairy farmer, Hamilton had seen the existential crises faced by small- and mid-sized farms—from bankruptcies to suicides—caused by the pressures of the existing food system. By focusing on the problems facing food producers through sustained engagement, Hamilton believed that his team could pry open the underlying issues facing the industry as a whole. Seville couldn’t have agreed more.

“Among the most critical systems—fuel, water, and food—we decided to go deep on food, engaging the people in that system with the most power to act, particularly the buyers who often set the terms of engagement for farmers,” recalls Seville. Thus the Sustainable Food Lab was born out of the Sustainability Institute, and its new niche proved to be fertile ground. Rather than position itself as an advocacy organization, nipping at the heels of the industry’s largest buyers, the Sustainable Food Lab chose to work closely with the food-buying juggernauts, facilitating conversations among suppliers, buyers, and the farmers themselves, both in the U.S. and in developing countries. The lab currently comprises 13 staff members, with expertise in three categories: regenerative agriculture, carbon neutrality, and sustainable livelihoods for farmers.

Typically, a Sustainable Food Lab project will begin with a company looking to put its sustainability claims into practice, and burnish its reputation along the way. “Branded companies are very conscious of their reputation,” Seville explains. “They want to maintain an overall good reputation and perhaps get an NGO off their backs. That’s a powerful leverage point.” From there, Seville and his team are able to bring multiple players to the table, beginning with their buyer clients and extending to the family farms themselves. In fact, Seville has found

that when it comes to facilitating breakthrough conversations, a field is a much better meeting place than a conference room.

“One of our big tools is what we call ‘learning journeys,’ where we get people on a bus and bring them down a bumpy farm road,” he says. These learning journeys often bring together people from every strata of the food system, from large-scale buyers (think Unilever and Nestle) to small-scale farmers—and the suppliers who stand between them.

“When we bring everyone down to a farmer’s field, we set up a very difficult dialogue, one where we can dig into each other’s worlds and start to find connections between people who are otherwise in a pretty tense relationship.” Seville is careful to not let these excursions turn into negotiating sessions; instead, they are carefully facilitated conversations in which players at every level of the food system begin to understand how they fit into the whole, and how the whole creates forces that affect them all. In a phrase, systems thinking.

“We may start by asking, ‘What would it take for this farmer to earn a decent living?’ From there, the supplier may share, ‘Well, Mr. Buyer, six months into the year you asked me to decrease prices by 5 percent, so I had to go back and push on the farmer. What else could I do?’” explains Seville. “Once the farmers, suppliers, and buyers really start talking to one another, we find changes that can make a huge difference.”

The interdisciplinary approach inherent to his work makes Seville a tough character to define. He talks like an economist, thinks like a sociologist, and has the soothing manner of a therapist. But the engineer is never far behind. “The training you go through as a mechanical or electrical engineer prepares you to ask good, common-sense questions,” he says. “When you’re examining basic market dynamics, like, ‘If we help this farmer double production and, consequently, double his income, what’s going to happen when everyone does that?’ That’s just thoughtful, causal thinking,” he said. “I come at this work through a [social] justice lens, but my engineering training at WPI and MIT helped me assume that, until proven otherwise, everyone is trying the best they can with the information they have—and it’s our job to uncover

how, for example, a buyer may be incentivized to ignore the fact that their push for lower prices affects a farmer’s basic standard of living.”

The work of the Sustainable Food Lab takes Seville and his team to every corner of the globe: from the vanilla farms of Madagascar to the soybean farms of the Midwest. But their work begins at home, quite literally. Seville and his co-housing community have spent the past 20 years running experiments to better understand how humans can lead lives rich in joy, community, and connectedness to the land that surrounds them.

WON'T YOU BE (AND STAY) MY NEIGHBOR?

The Sustainable Food Lab may be what has put Seville’s community on the map, but the lab is only one part of Meadows’s vision, foremost of which is the Cobb Hill Co-housing community itself. Built into the hillside like a terraced garden, Cobb Hill comprises 20 discrete households, all connected by a common heating and electrical system. Near the top of the hill sits a colossal wood furnace that provides heat for everyone, fed and maintained on a rotating schedule by the community’s 50 residents. Though each family has a home of its own, the group shares several common spaces for town hall-style meetings and community meals.

One family runs the on-site dairy and vegetable farm, but all residents pitch in to maintain the sprawling property. The annual budget is negotiated in a community-wide meeting, and monthly meetings are used to discuss new policies and other governance questions. Given their commitment to collective decision making and shared living, the pandemic was hard on the group; after a two-year hiatus, they look forward to coming together again soon for a shared meal.

The strains of a close-knit community are not for everyone, and families sometimes opt-out after trying the experiment for a few years. “When the first family moved out, it felt like such a crushing failure of vision,” says Seville. “Five years later, I realized the only way we’re going to survive is if people for whom this doesn’t work feel free to move out and people for whom it does move in.”

For the 20 families who call Cobb Hill home, the co-housing experiment is an opportunity to test sustainable practices—as well as the consensus-building required to see them through. “At this point, there’s no fossil fuels at all in the heating of our homes. Transportation is our last fossil fuel footprint,” says Seville. “But we don’t all have the same vision of where a tree should go, or whether mowing our lawns is consistent with a commitment to sustainability.” When it comes to the inevitable conflicts, Seville again puts on his facilitator hat, asking the same measured questions he learned at WPI, and that he puts to use every day in guiding major corporations toward more sustainable and just practices. He acknowledges that the human equation has been the most challenging part of managing a shared community, but maintains that perfection is not the goal—trying is enough.

“Cobb Hill is one imperfect experiment on a little corner of land,” he says of the eco-village he calls home with his wife and two children. “This is not a silver bullet as to how to live sustainably; it’s just our intentional choice to live on a farm where we’re involved in food production, working alongside our neighbors, and trying to maintain environmentally sustainable homes. But this is just one option.”

From the patience and critical thinking required to successfully manage a co-housing community, to the deep analysis it takes to help corporations and farmers see a way toward better practices, Seville points to his engineering roots as what makes it possible. “You absolutely can use a science and engineering background to tackle social or business problems,” he says. This fall, Seville’s son, Finn, began his academic career as a WPI freshman. “Even if he doesn’t end up becoming an engineer, I’m delighted that this is his starting point. That background always pays off.”

Seville walks across the meadow at the top of Cobb Hill and begins picking his way along the gravel path that winds past his neighbors, the community farm, and back to the offices of the Sustainable Food Lab. “You absolutely need to do whatever you can to make a difference,” he says. “And that has to be enough.”



Sustainable Vanilla Initiative

Vanilla may be one of America’s favorite ice cream flavors, but it is also one of the world’s most economically volatile crops, with prices fluctuating from \$500 to \$50 per kilogram within a five-year span. This volatility makes it a perfect storm for farmer poverty, with family farms unable to anticipate and leverage the market highs and lows.

Spurred by work with ice-cream maker Ben & Jerry’s, the Sustainable Food Lab co-founded the Sustainable Vanilla Initiative (SVI) with a partner organization in the Netherlands. Through multiple trips to Madagascar, the world’s foremost supplier of vanilla beans, Seville and his team better understood the forces affecting this market.

Together, they discovered that much of the challenges facing vanilla farmers stemmed from the crop’s relatively long growth cycle: Vanilla beans take nine months to grow and nearly that long to cure. During that time, market demand can drop sharply, greatly reducing prices, and leaving the farmer saddled with a bumper crop worth far less than when it was planted. Today, SVI’s members represent 70 percent of the vanilla market, all working together to stabilize pricing, reduce farmer poverty, and produce a better bean for your next vanilla milkshake.



The Invisible Work of Babies

VIDEO ETHNOGRAPHER KAJSA BRIMDYR SHOWS
THE SIGNIFICANCE OF SKIN-TO-SKIN CONTACT

BY JULIA QUINN-SZCESUIL • PHOTOS BY TONY RINALDO

Some people are lucky enough to have a lightbulb moment in their lives that reveals a career path they are destined to take. But for many, the path is more like a hopscotch game—landing in one spot before they advance to the next.

For Kajsa Cadwell Brimdyr '92, the path from a computer science major and devoted theatre enthusiast at WPI to an international expert on maternal child health and a lead ethnographic researcher for Healthy Children Project, Inc., was not direct. But each step, she says, led her to the next right spot.

Brimdyr, an expert on continuous and uninterrupted skin-to-skin contact in the first hour after birth, documents the essential but often invisible benefits of this magical hour using video ethnography. She advocates for letting the tiniest human beings do the work that is instinctive and beneficial for both baby and mom—but often not understood or prioritized in the wider healthcare system.

Bringing attention to invisible work, the essential tasks that are frequently unacknowledged, is one of Brimdyr's specialties. She believes video ethnography—the recording of subjects in their current setting



“The thing I loved about computer science was that it was unknown. The idea was you’re learning something knowing you’d have to innovate so you could continue to learn because the challenges were going to continue.”

for research purposes—is an excellent tool to help people understand an activity’s complexities that might otherwise go unnoticed. With the knowledge that a baby’s instinctive journey during this sensitive time after birth leads to the best outcomes if it is allowed to happen, getting that word out became her passion.

She witnessed the barriers herself. Looking around the busy labor and delivery room after delivering her first daughter, Brimdyr’s research brain knew how skin-to-skin contact supported the work of the baby. But as a new mom, she saw how the fast-paced period immediately following birth leaves little time for an unplanned request for an uninterrupted hour of skin-to-skin contact. And how choosing a supportive system can make all the difference.

If that hour is prioritized, the potential impact is extraordinary. “With nothing more than skin-to-skin contact in that first hour after birth, you can reduce the infant mortality rate by 22 percent,” she says. “The baby hears the mother’s heartbeat, is warmer, is colonized by the mother’s bacteria. Everything is more stable.”

A PULL TO MATH AND THEATRE

The roots of Brimdyr’s work began at WPI where she developed the research and presentation skills that she says formed the foundation of her career as an ethnographic researcher who uses video to explore the stories of invisible work.

As a high school student, she loved high-level mathematics and had her sights set on engineering. But she was also comfortable in the world of theatre, refining her artistic skills as a decade-long veteran of the esteemed multigenerational Harwich Junior Theatre on Cape Cod. While she was drawn to WPI because of its particular emphasis on technology and the challenges it offered, when she read about Susan Vick, the now-retired director of WPI’s drama and theatre programs, and saw the endless opportunities for theatre work on campus, she knew WPI was her place. “The idea that you could combine engineering with theatre was so exciting,” she recalls. “It brought together the things I was most fascinated by and that I loved. I look back now and say it all makes sense.”

For Brimdyr, being able to adroitly run the lights, stage a set, play a lead role, or write a play wasn’t far from working effectively on a math problem, she says. “It’s that connection to mathematics and to the idea of problem solving and challenges,” she says. “When I visited WPI, everything I heard was about teamwork and cooperation and overcoming challenges. That all really appealed to me.”

But without a direction, Brimdyr realizes she might not have ended up in a career she loves. “I was lucky enough to have Van A [Dean John van Alstyne, a former mathematics professor] as my advisor,” she says, and that changed everything. “He was a magical, magical man who saw who you were, saw your potential, and saw the opportunities. He was the one who steered me to computer science when I thought I was originally going to do electrical engineering.” Van A purposefully made time for students, Brimdyr says, and when she walked into his office, she felt seen and understood. “He knew you and was interested in you as a person,” she says. “There was something about his presence that enveloped you.”

At the time, computer science was a burgeoning field, nearly tripping over itself with new developments and advances. For someone who knew

she wanted to change the world in some way, it was tough to get a grip on what that meant for a career. But Van A provided the direction Brimdyr needed. “I remember him always having time,” she says. “That’s really important when you feel like you aren’t sure what you’re doing or you know this is the right path but don’t know what to do with it. But for those of us who know they don’t have a straight path for their future, that can feel intimidating. I knew I needed to be part of a team that would change the world, but that’s not a path. To get from those feelings to something more concrete is tricky.”

Even as Brimdyr learned a new computer language or skill, she was fully aware that she would need to start over again shortly as knowledge evolved. “The thing I loved about computer science was that it was unknown,” she says. “The idea was you’re learning something knowing you’d have to innovate so you could continue to learn because the challenges were going to continue.” And she thrived in an environment that celebrated continually evolving projects and problems with no set final answer. She carefully watched those around her to figure out how she could have both the career and the life she wanted.

Former computer science professor Mary Hardell was one such role model. “She taught assembly—one of the hardest computer science classes there was,” she says. “And she was tough; she took no nonsense. I thought, ‘I want to be you, and I can be in this field.’” As a counterpoint, Brimdyr found a “gentle and sweet” demeanor in David Finkel, her computer science advisor. With the success of two such disparate people, Brimdyr had proof that she could be true to herself while following her heart.

Brimdyr’s Major Qualifying Project (MQP) allowed her to sharpen the skills that she uses to this day. Her team worked on their human-computer interaction project, and advisor Craig Wills, then a new professor at WPI, worked with them to get the innovative research published. Even after graduation, Brimdyr continued to present the work. With continual refinement of her presentation skills, she became comfortable with extensive research and with explaining its value to many audiences.

The flip side of her WPI work—theatre—was significant for her professional development. “The theatre people were all mine—that’s my group,” she says. Working under the direction of Vick, Brimdyr wrote, directed, and produced plays for Masque and New Voices and occasionally did sound and lighting for Lens and Lights.

“If the Harwich Junior Theatre was my foundation, WPI theatre elevated it,” she says. “The theatre we were doing was so fascinating because it was engineering theatre. We were doing the Scottish tragedy and we said, ‘What we really need to do is have a running river going through the middle of the stage. And when she plunges her hands into the river, it needs to turn red with blood and it needs to run through the audience with blood-red water,’” she says, laughing; red Jello and innovative engineering was the obvious solution.

AN UNEXPECTED PATH

For Brimdyr, becoming a researcher in the maternal child health arena didn’t happen right away. After graduation, she took a job with Digital Equipment Corporation implementing management protocols, putting theory into practice with a team of expert programmers. “I loved every minute of it,” she says. While working for Digital, Brimdyr was presenting

“You are so lucky to have this opportunity in this hospital for skin-to-skin contact after birth. Your baby will hear your heartbeat and your face will be the very first your baby ever sees.”



her MQP work at a conference when a chance conversation steered her toward Blekinge Institute of Technology in Sweden. She learned about the university's newly developing human-computer interaction program. One thing led to another and “I quit Digital and moved to Sweden,” she says.

While working there, helping to develop a bachelor's and a master's degree in People, Computers, and Work, she earned her master's degree in human computer interaction from Vermont College's remote program and then her PhD from Union Institute & University. One of Brimdyr's PhD courses was on ethnography, the study of how people work, and she found the direction she wanted. As she focused her dissertation on the invisible, unnoticed work of women, in particular the job of a front-desk receptionist, the pathway to changing the world with her work opened up.

The idea of invisible work stayed with Brimdyr even as she returned to the States to raise a family with her husband, Joshua Howard Brimdyr '92. She continued to spend 10 weeks in Sweden every year to teach courses in human and computer interaction at Blekinge but also began to work with her mother on maternal/child healthcare. Her mother, a noted maternal/child healthcare expert, founded Healthy Children Project, Inc., where Brimdyr works now. “She understood the new research that said when babies are born, they should be skin-to-skin,” says Brimdyr, “so when I had my daughter in '97 (Emma '19), I knew that. I thought it was amazing and magical, but it was unusual for that time. And I looked around at all the people in that room doing important and invisible work, and I became fascinated by what was happening in the labor and delivery room.”

The fascination was twofold. The labor and delivery process was often predicted by evidence-based practice but also by set rules, time restrictions, and insurance regulations. Brimdyr wanted to know what barriers could prevent something as simple, evidence-based, and cost free as skin-to-skin contact in the first hour.

ADVOCATING FOR SKIN-TO-SKIN CONTACT

Brimdyr began working internationally with countries looking to reduce their infant mortality rates. With her video and ethnography background, Brimdyr connected with Ann-Marie Widström, PhD, nurse midwife, an international expert who first observed and documented the nine stages of a baby's behavior after birth, and realized healthcare workers would need to actually see the baby's work to understand why skin-to-skin was essential and not simply a nice-to-have snuggle with mom.

The power of watching a baby or reading about the experience is vastly different, she says. “Seeing it changes everything. You have to value the work the baby is doing. Once you see what they are doing, it is remarkable.”

Brimdyr began to use video ethnography with iterative design skills to get the word out about skin-to-skin contact with *Skin to Skin in the First Hour After Birth*, which informed and educated a healthcare audience showing how to promote skin-to-skin contact after a vaginal or cesarean birth in U.S. hospitals. She then created the Telly Award-winning documentary, *The Magical Hour*, a video for a parent audience. She worked with Tobey Hospital in Wareham, Mass., where she had experienced the best-practice, evidence-based skin-to-skin contact with her own births, to create the *Happy Birth Day* video series, available on Amazon.com, to illustrate normal birth and immediate skin-to-skin contact. Brimdyr also used video ethnography to conduct research, especially in Egypt and the U.S., publishing vital research papers in peer-reviewed journals documenting the stages of the newborn during the first hour after birth, and the impact of labor medications.

Currently, Brimdyr presents her skin-to-skin research for premature infants to organizations, governments (including a recent video ethnography project for the Ministry of Health for Uganda), and conferences worldwide, instructing the midwives, healthcare providers, speech language specialists, and other professionals in attendance of the benefits of skin-to-skin contact in the first hour after birth. She knows that showing a baby's work in that time is going to help both healthcare staff and parents advocate to change the system, she says, because “parents can ask for this, but it's the system that determines if it will happen.”

OVERCOMING BARRIERS

In each location, barriers pop up—from lack of time to not understanding the proven impacts of having a baby skin-to-skin in the first hour after birth, instead of being held wrapped or in an electric warmer. In the U.S., she finds systemic racism is one of the largest and most persistent barriers to implementing skin-to-skin contact in the first hour. In the Baby-Friendly Hospital Initiative (BFHI) launched by the World Health Organization and the United Nations Children's Fund, skin-to-skin contact is part of the standards hospitals must implement. But in the U.S., many areas with predominantly Black residents do not have any Baby-Friendly hospitals near them. “So right there is a huge problem,” she says, noting that the rates of infant mortality for Black babies is higher than those of other populations.

In the U.S., parents are sometimes asked if they want skin-to-skin contact after birth, she says, but the question and the follow-up are too frequently sporadic. Even if parents say yes, the baby could have fleeting contact and not a full hour. And the way each provider presents the opportunity influences the result. When hospital staff told Brimdyr that patients weren't interested in skin-to-skin time, she asked to follow a nurse into a room to hear what patients were saying.

“The nurse said, ‘After the baby is born, it's bloody and sticky. Do you want us to give it to you that way or wipe it off and give it a bath first?’” Shocked, Brimdyr asked if she could take a turn with presenting the idea to the next patient. “I went in and said, ‘You are so lucky to have this opportunity in this hospital for skin-to-skin contact after birth. Your baby will hear your heartbeat and your face will be the very first your baby ever sees. Would you like to do that?’ And the mother said, ‘Yes’ and then the nurse said, ‘We can do that.’”

The fault lies squarely in one place. “It's the system,” Brimdyr says, noting that she frequently reaches back to her WPI foundation and her problem-solving skills throughout her career. “Step one is to see the baby and to ensure that the baby's work is not invisible,” she says. “This takes problem solving, teamwork, and using new technology all the time. And then the theatre comes in as I am always presenting—whether that's to a crowd of 1,000 or a team of four at a nurses' station.”

Gaining all those skills and using them while at WPI made an impact on Brimdyr's life. “It all comes back to that question of ‘I want to change the world and I have no idea how I am going to do that,’” she says. “You can do that if you have the tools. You're going to be jumping into new teams and you have to figure out how to make it work.”

As she did at WPI, Brimdyr embraces the challenges. “I'm the kind of person who is never going to retire,” she says, “and I've known that since I was tiny. My work is my passion. It's everything I think about. I think about it at night, and I wake up excited. It is part of who I am. That first hour after birth is such a sensitive and amazing period. It makes me think everything is possible.” 📌



"We fire protection engineers are quite passionate about our profession and WPI's FPE program gave us the tools to help prevent fires and save lives and livelihoods. My father was a professor in ME and an ardent supporter of the FPE program with Fitzy, Don Zwiep, and Dave Lucht, so my heart is in supporting the continued success of WPI and the FPE program."

APRIL L. HAMMOND '85

April L. Hammond '85 grew up in the WPI community—her father, Professor Thom Hammond, spent 22 years teaching at WPI. During his tenure, the WPI campus became April's playground. She spent time swimming in the pool, sledding down the Hill, and peeking into Mrs. Higgins's beautiful gardens.

It was her father who suggested getting a degree in Fire Protection Engineering, and because of her parents' invaluable lifelong support, April created the Fahire and Professor Thom Hammond Endowed FPE Graduate Support Fund in their honor. A member of the Alden Society, April is establishing her legacy at WPI by including WPI in her estate plans.

HAVE YOU INCLUDED WPI

*in a will or trust? In a life income gift? As a beneficiary of life insurance, IRA, or other retirement account? Membership is about giving you recognition **now** for your plans to support WPI in the **future**.*

To join, visit plannedgiving.wpi.edu.



FOR MORE INFORMATION CONTACT
Lynne Feraco,
Assistant Vice President of Gift Planning
774-239-7326 | lferaco@wpi.edu



ALUMNI NEWS



From the Desk of

PAULA M. DELANEY '75 PRESIDENT, WPI ALUMNI ASSOCIATION

Dear Alumni,

Thanks to all who joined us on the Hill for The Herd Comes Home, WPI Homecoming 2022.

The Crimson and Gray was in full force Sept. 30 to Oct. 2 for a weekend of friendship, celebration, competition, and lots and lots of school spirit. Campus guests were treated to activities ranging from the Athletic Hall of Fame Induction Ceremony, Pep Rally, and Greek BBQ to the highly spirited First Year/Sophomore Rope Pull, the WPI Engineers vs. Merchant Marine football game, and the alumni vs students Donahue Rowing Center crew races.

Of extra special note during the weekend was the banner presentation for the WPI Women's National Champion Varsity Eight crew team. Last season, the team became WPI's first women's NCAA champions, joining Eric Meerbach '87 (1986 NCAA Division III Men's Golf) as the only NCAA champions in school history.

Homecoming Weekend is always a special time to visit campus and join in the collective pride of our great alma mater. Please plan to join us for Homecoming 2023!

LEARN HOW YOU CAN SUPPORT OUR GREAT ALMA MATER HERE: [WPI.EDU/+ALUMNI](https://wpi.edu/+alumni) AND [WPI.EDU/+GIVE](https://wpi.edu/+give). TO FIND OUT MORE ABOUT BEYOND THESE TOWERS: THE CAMPAIGN FOR WPI, VISIT [WPI.EDU/+BEYOND](https://wpi.edu/+beyond).

Alumni Support WPI's Culture of Philanthropy

Of the many great traditions honored at WPI, that of philanthropy is the cornerstone of the university. When John Boynton founded the school 157 years ago, he did so believing an education based in science and technology should be available to all, not just those with the means to afford it.

For generations, WPI has worked to maintain this great tradition, and today dedicated alumni hold fast to the culture of philanthropy by serving as ambassadors to both Giving Day, its single biggest day of philanthropy, and the Goat Nation Challenge, a weeklong fundraising challenge to benefit its 13 varsity athletic teams. Ambassadors and donors who support these collective efforts play a key role in *Beyond These Towers: The Campaign for WPI*.

Alumni ambassadors serve as cheerleaders to help rally philanthropic giving to the university. Many support their personal passions on campus by providing additional visibility for their favored student clubs, athletic teams, academic departments, etc.

For example, the story of the newly formed WPI Equestrian Club was shared with the entire WPI community in a way that wouldn't have been possible without one of their members serving as an ambassador. Likewise, by having an ambassador from the Alumni of Color Association, the group was able to raise funds to support the new Dr. Debora Jackson Endowment for BIPOC Students.

Valerie Mason '92, P'25, who served as a Giving Day Ambassador in support of global projects, is head of process and business excellence for global HR at Takeda Pharmaceuticals. "I serve as a WPI philanthropy ambassador because I want others to afford the same or better experiences as I was afforded. If I can give back and help an aspiring scientist, engineer, author, teacher, or game designer, I've done my alumni duty," Mason says.

"I really enjoyed reconnecting with my classmates while I served as a Giving Day Ambassador for WPI," she adds. "It was a fun challenge to help the organizations that mean the most to me, and it rekindled my love for the four years I spent at WPI as a student, and for the four years I'm currently spending as a parent."

Philanthropy ambassadors receive training along with a toolkit of ideas, photos to use in promoting their cause, and samples of email and social media messages. Additionally, ambassadors receive a unique URL to use when asking others to make a gift. This allows WPI to track in real time how effective each ambassador is and enables ambassadors to compete for bragging rights and WPI swag prizes.

All alumni are invited to serve as WPI philanthropy ambassadors. Visit the Giving Day website: givingday.wpi.edu to view recent Giving Day ambassadors. To register as a Goat Nation Giving Challenge ambassador, please contact Liz Chirico at ejchirico@wpi.edu.

REUNITE. REVISIT. RELIVE.

ALUMNI WEEKEND @WPI

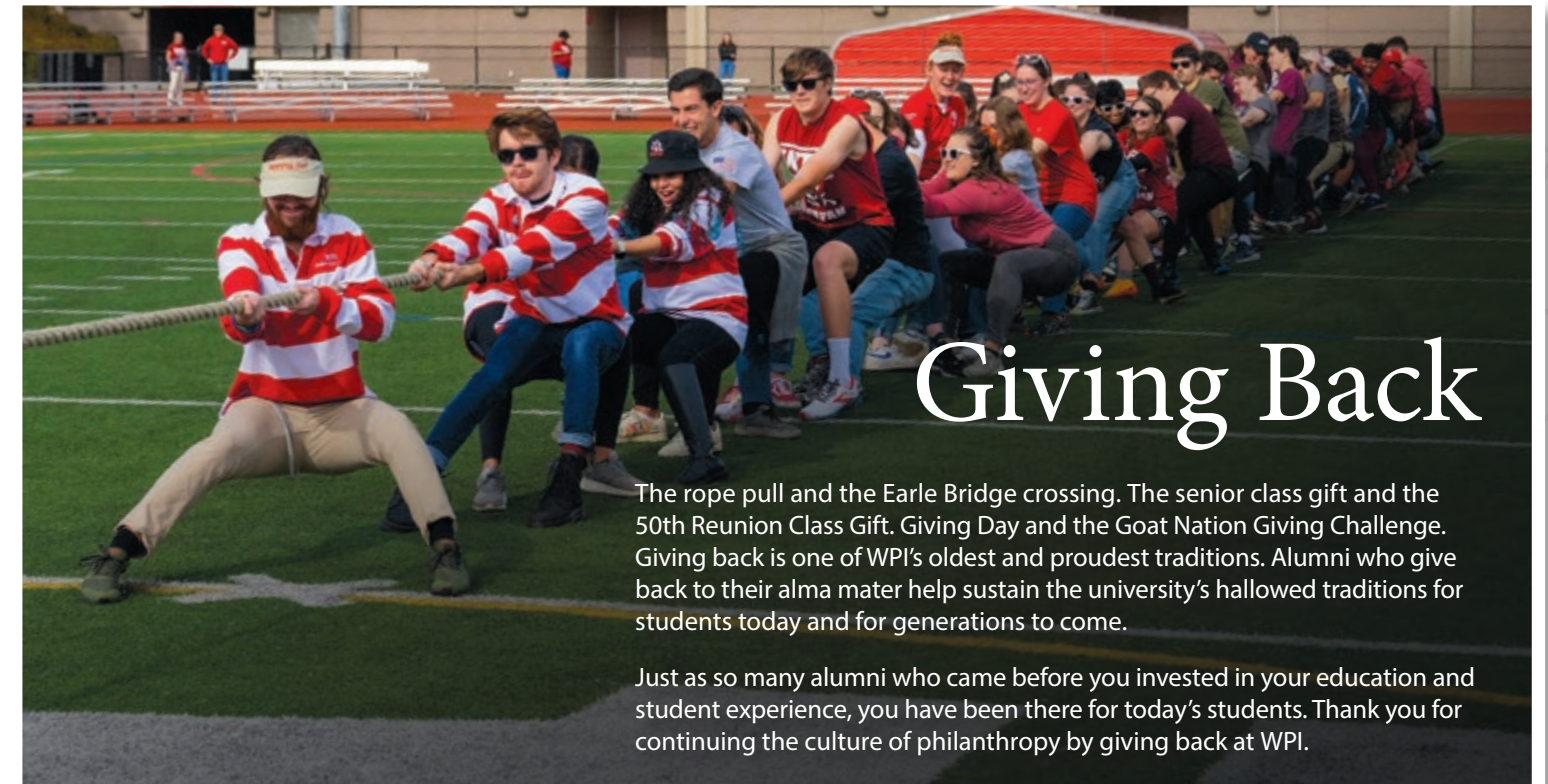
MAY 18-21, 2022

More information to come.

Make sure that the Office of Lifetime Engagement has your current contact information on file, including your email address, so we can keep you informed about all the plans.

Email us at: alumni-office@wpi.edu

WPI.EDU/+ALUMNIWEEKEND



Giving Back

The rope pull and the Earle Bridge crossing. The senior class gift and the 50th Reunion Class Gift. Giving Day and the Goat Nation Giving Challenge. Giving back is one of WPI's oldest and proudest traditions. Alumni who give back to their alma mater help sustain the university's hallowed traditions for students today and for generations to come.

Just as so many alumni who came before you invested in your education and student experience, you have been there for today's students. Thank you for continuing the culture of philanthropy by giving back at WPI.

TURNING POINT

Jason Reposa '02 Feels Good About Cannabis Beverages

Throughout his life, Jason Reposa's personal mantra "Say yes to everything" has proven to be both a blessing and a curse. This willingness to try anything has opened doors to exciting opportunities for the computer science major, but also contributed to such high levels of stress that his body sometimes rebelled, forcing him to seek out creative solutions for pain relief.

Which is how, after years of working 100-plus hours a week at software development and marketing firms in New York City, hustling side jobs, and co-founding and then selling his own business, he now finds himself—somewhat unexpectedly—knee deep in the relatively new cannabis beverage industry, saying "yes" to what he calls a life-changing solution for pain and stress relief.

"I was experimenting with cannabis for my own purposes. I had no intention of starting a company—I just wanted more pain relief," says Reposa, who founded Good Feels, a cannabis-infused seltzer and beverage enhancer manufacturer, in early 2022. "It's a common refrain you hear from people trying cannabis beverages for the first time. They want pain relief but they don't want to be using Advil all their life. They've heard about the benefits of cannabis but they don't want to smoke it and they don't feel in control when they use edibles."

What began as an experiment in his basement has turned into a growing business in a 1,900 sq. ft. facility in Medway, Mass., that bottles up to 40,000 units per month for distribution at nearly 50 of the state's 230 cannabis dispensaries. Plans are in the works for a new 11,000 sq. ft. facility in Holliston, Mass., with capacity to produce more than 500,000 units per month.

"I go super deep into whatever I'm doing. I bought some equipment and learned everything I could by reverse engineering these water compatible formulas," he says. "I wanted to know, 'How does it all work?'"

Programming Made Sense

Reposa took a nontraditional route to WPI, transferring from Middlesex Community College in his sophomore year. After graduating from Tewksbury High School without firm college plans, he signed up for classes at MCC on a whim and immediately discovered he had a talent for computer programming.

"I realized programming was something that just gelled with my brain. I didn't have to struggle at all; I just inherently got it," he says. After two years of succeeding in every programming class possible at MCC, he earned a full ride to any state school to continue his education. Instead, he chose WPI.

"I thought, if I'm going to go for it, I'm going to go big. Engineering and hard sciences attracted me and technology is in my blood, so I took a big swing," he says, adding that the brilliant minds he discovered at WPI made him work even harder. "I took all these advanced courses, and they expanded my world as to what was possible."

He went to London for his Interactive Qualifying Project, where his team worked on transportation projects for the town of Merton, just outside of Wimbledon. But in his senior year, before he completed his Major Qualifying Project, he was recruited for a high-paying consulting job and he left school before graduating.

"Those were the dot-com days. Companies were handing out six-figure salaries to programmers, especially those with a WPI pedigree behind them," he says. But then the bubble burst, the high-paying jobs disappeared, and he returned to WPI to finish his MQP with fellow dot-com refugee Tim Garthwaite. Their project on mesh decimation allowed easier rendering of 3D models, an idea that was novel at the time but is now built into major 3D modeling programs.

After completing all necessary requirements for his degree, Reposa spent the next few years saying yes to every job opportunity—teaching programming courses at MCC, building websites, and even founding a moving company. In 2004, when the tech job market started to improve, he moved to New York City as the director of technology at a software development company, while also working on freelance projects on the side, with the ultimate goal of owning his own business.

He eventually rose to CTO at an exciting marketing agency, "where we were practically sleeping under our desks" due to all the work. Even getting married and surviving testicular cancer couldn't slow him down—until he developed TMJ, a locked-jaw disorder brought on by stress. He endured months of painful traditional medical treatment while surviving on liquid diets until his jaw finally loosened up.



PHOTO BY JOHN GILLOGLY

He and two colleagues left the marketing agency to co-found My Bank Tracker, an online source of banking information. A year later they were also running a full-service ad agency, which they eventually spun off into its own business while Reposa remained CEO of My Bank Tracker.

He moved his family back to Massachusetts in 2017, and two years later he was in the middle of selling My Bank Tracker when overwhelming stress again caused his jaw to lock up. He also hyperextended his knee on an "epic hike" with a friend, and he discovered unexpected relief from both issues when he tried water-compatible CBD.

"When you prepare CBD with this new technology, it becomes much more bioavailable to your system," says Reposa. When consumed through edibles, cannabis is processed in the liver, while water-compatible CBD enter the system through the intestines, allowing the user to feel the effects within 10 minutes with a duration of about an hour. This gives the user more control

over the intensity and duration of the effect, an experience he likens to having an alcoholic drink. Alternatively, the beverage enhancer can be discreetly added to any drinkable liquid—such as a soda, juice, or even milk in a cereal bowl—and comes in lemon-lime and non-flavored.

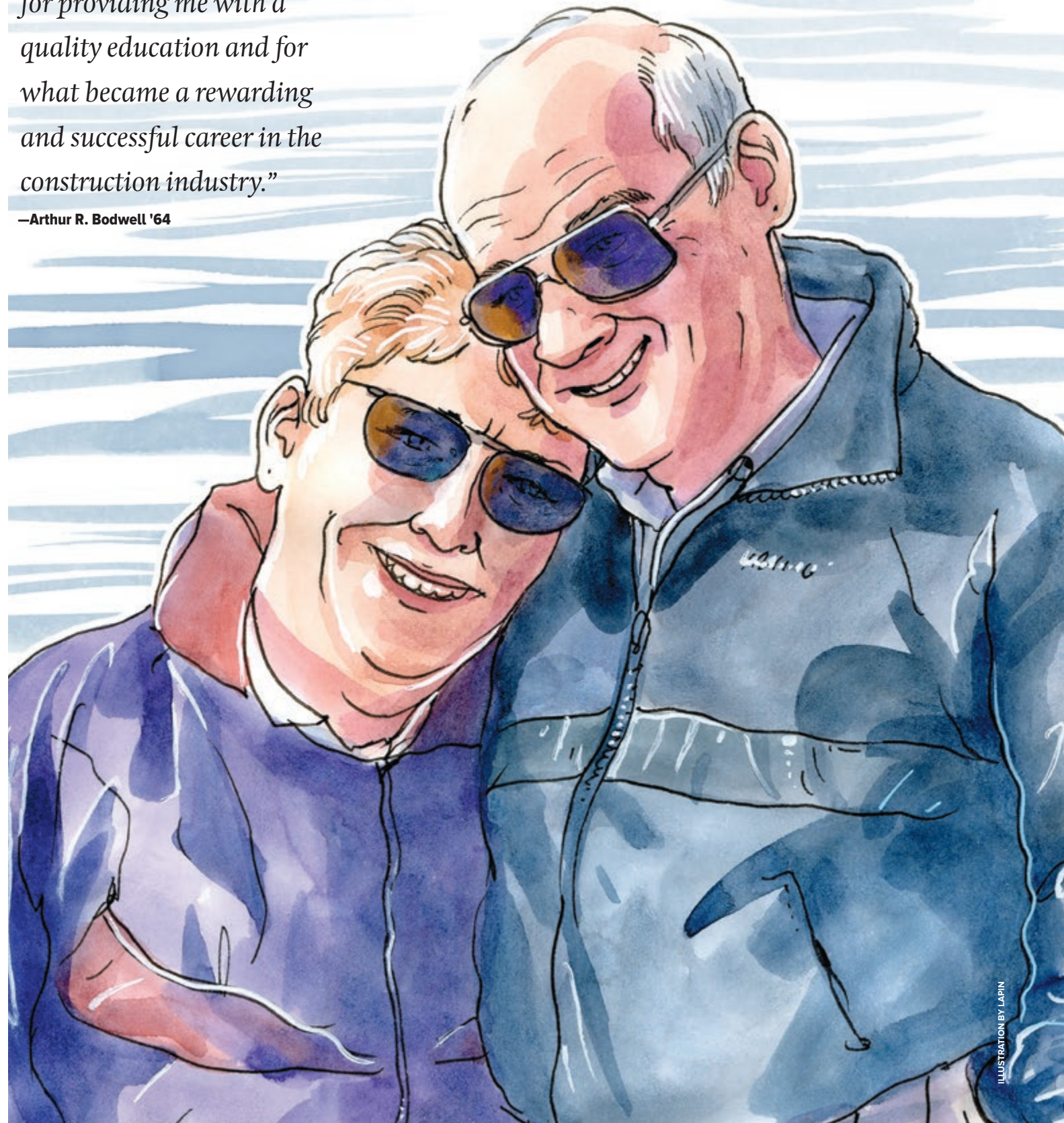
"Cannabis technology just made a very large leap, and we are one of the few companies that recognize it," he says. "It's extremely undervalued."

Reposa is currently in the process of raising \$1.5 million for the Holliston expansion and sees the potential market as an untapped goldmine. "Ninety five percent of our market doesn't know we exist as an industry. Beverages have so many benefits," he says. "It's an entry-level product, especially the low-dose version, for people who want pain relief or just want to enjoy their night without having to smoke anything."

—Kristen O'Reilly

“I owe a great deal to WPI for providing me with a quality education and for what became a rewarding and successful career in the construction industry.”

—Arthur R. Bodwell '64



ENDOWED SCHOLARSHIP REFLECTS GRATITUDE FOR A DREAM CAREER

Arthur R. and Roberta M. Bodwell Scholarship supports *Beyond These Towers: The Campaign for WPI*

Arthur Bodwell '64 always wanted to be an engineer. “My earliest childhood memories include building things,” he says, from Lincoln Logs and erector sets to a myriad of toy construction and design playthings. He was a good student in high school and excelled in math, he says, “but like many of my peers, I was the first child in the family to attend college, so when it came time to look at schools, the search process was a bit of a mystery.”

With the help of a guidance counselor, Bodwell began reviewing the limited college recruitment materials available at his high school. Thinking it would interest him, the counselor shared a brochure advertising WPI’s Techniquest — a one-week program allowing rising high school seniors to experience what an engineering education entailed. Students attended typical classes, participated in labs, and took tests. Bodwell thoroughly enjoyed the week and upon its completion, he was told he was a good fit for an engineering program.

Never seriously considering other schools, Bodwell applied to WPI and was accepted. Like many college students, paying for college was a major concern for Bodwell and his family.

“My parents supported my goals, but as the parents of seven children, they did not have money to spare. Even in 1960, when WPI’s tuition was around \$1,100 for the first year, the money I saved from summer jobs was not nearly enough,” he says. “Thankfully, my WPI acceptance came with a \$300 scholarship.”

With his summer job and the continued financial support from the school, Bodwell thrived at WPI. His scholarship increased in his sophomore year, and he worked in the Morgan Hall cafeteria to pay for meals. After declaring his civil engineering major, he received full scholarships for his junior and senior years.

As Bodwell approached graduation, Professor Carl Koontz, then head of the Civil Engineering Department, asked him about graduate school. “I told him I had thought about it but would put it off until I could afford it. Shortly afterward, he told me he found a grant that would cover my graduate degree and a small living stipend. Flabbergasted and grateful, I accepted the grant and left WPI after five years with both a bachelor’s and a master’s degree in civil engineering.”

Bodwell says his years at WPI were some of the best of his life, explaining that the small campus, small class sizes, and easy access to

professors were a perfect fit for his needs. “WPI developed a naïve, small-town kid who had not experienced much in life into someone who felt confident enough to venture out into the world and hold his own.”

Beyond the academic benefits of his time on campus, Bodwell’s personal life also flourished. “Between my junior and senior years, I married my high school sweetheart, Roberta. We spent our first two years together in Worcester, and it could not have been better,” he says. Bodwell retired in 2008, after 43 years in the construction industry. For a good portion of that career, he worked for a design/build firm specializing in collegiate athletic and recreation facilities — a dream career for someone who loved both sports and construction.

Never forgetting the help Bodwell received from WPI and how it impacted them, the couple agreed they would include a scholarship for future WPI students in their estate plans. “We knew how the financial help I received as a student impacted the quality of our lives,” he says, “so we established the Arthur R. and Roberta M. Bodwell Scholarship as our way of offering gratitude to the university.”

The scholarship supports civil engineering majors, reflecting Bodwell’s passion for civil engineering and his view that the world needs more high-quality engineers.

“Thanks in part to my WPI education, my family and I lived a very good life,” he says. After Roberta died in 2017, Bodwell began funding the scholarship “to provide help earlier to those students who, like me, needed it to pursue their dreams. The self-sustaining fund, which is now fully endowed through my estate plan, will grow and support generations of young engineers in perpetuity. I could not be happier, and I know Roberta would be, also.”

Today, Bodwell lives in North Carolina near one of his daughters and spends his days playing golf and continuing his wood-turning and furniture-building hobbies. One of his great joys is receiving thank-you letters from the scholarship recipients.

“Their stories are remarkably similar to mine, some 60 years later,” he says. “Scholarship recipients have voiced deep gratitude for the help they received to pursue their dreams at WPI. This alone has proved the worth of endowing a scholarship at WPI.”

—Sira Naras Frongillo



“My hope for WIN is that it continues to provide women and girls of all ages with mentorship and leadership opportunities in STEM that will benefit them throughout their careers.”

Karen Oliver '82

WIN Grant Award Has Immediate Impact

FIRST INTERNATIONAL GRANT SUPPORTS TANZANIAN SCHOOL CHILDREN

The Women's Impact Network (WIN) recently awarded its first grant for a project outside of the United States. The \$22,300 grant – the largest award to a student in WIN history – made an immediate impact on public primary school children in Kilimanjaro, Tanzania.

WPI African Student Association president Elitumaini Swai '22, '23 (MS), founded the Sayansi Ambassadors project to bring hands-on learning experiences to public primary schools in her hometown of TPC, Moshi Kilimanjaro. By arousing academic curiosity, the Sayansi Ambassador project enables students to develop a deeper understanding of theoretical science concepts and how that knowledge can be applied to real-world practices.

“As new science concepts are complex to understand, many Tanzanian public-school children struggle to understand when they are taught through theory only. The Sayansi Ambassadors project helps students see the practical nature of science, inspiring them to see the role of science in addressing the needs of their home communities,” says Swai, who also received a grant from The Global School's Davis Peace Projects when she launched the program in August 2021.

WIN is a women-led philanthropic organization committed to the continuous advancement of women in STEM across WPI's local and global community. WIN knows the value of WPI's hands-on, project-based, globally aware curriculum; they've seen firsthand how a WPI education can make a difference in the lives of individuals, communities, and, in many cases, their own lives. With the goal of building a network of women who lead and support women in STEM initiatives, WIN has awarded over \$1.3 million in grant funding since its inception in 2016. A strong funder of *Beyond These Towers: The Campaign for WPI*, WIN uses its pooled gifts to support WPI's strategic priorities, ranging from diversity, equity, and inclusion, curriculum enhancement, and K-12 pipeline activities to student support, academic research, and wellness and well-being programming. In 2021 alone, WIN received \$260,000 in grant requests from the WPI community and was able to award over \$180,000.

“My hope for WIN is that it continues to provide women and girls of all ages with mentorship and leadership opportunities in STEM that will benefit them throughout their careers,” says Karen Oliver '82, WIN executive committee member.

A Dream Come True

For Swai, the WIN Impact Grant was a dream come true. “Making an impact in my home community has always been a great motivator for me, so to have the Sayansi Ambassador project be supported by WIN was an incredibly impactful and meaningful experience. The WIN grant will allow the Sayansi Ambassador project to continue its mission to inspire STEM students through hands-on learning; empower girls and young women especially on their journey to STEM fields; enhance, enrich, and beautify the education resources of low-income Tanzania communities; and, finally, to maintain my relationship with WPI in hopes of one day developing an Interactive Qualifying Project center in Tanzania,” says Swai.

She adds, “With support of the WIN grant, I learned there exists uncultivated STEM talents from disadvantaged communities, which, if channeled into the right direction with the right resources and mentorship, can spark a much-needed industrial revolution for Tanzania.

“And just as my presence in Tanzania inspired the program's children to achieve remarkable things despite the challenges of their backgrounds, the women of WIN have inspired me to continue my work promoting STEM to underserved populations,” she says. “As WIN's leadership and generous philanthropic giving made a positive impact on my life and the children of TPC, Moshi Kilimanjaro, I pledge to follow in their footsteps as a strong female leader and supporter of women in STEM.”

—Sira Naras Frongillo

CLASSNOTES

submit yours to CLASSNOTES@WPI.EDU



▶ DON ZWIERS '55

1955

Don Zwiers was passionate about sustainability long before the term was in the common vernacular. According to his daughter Nancy, he was an early adopter of recycling and composting, cajoled his family to turn off lights, and even carried a trash picker-upper stick so he could clean up litter. It was that passion for sustainability that led him to start his own company, Deco-Link, to recycle fiberglass scraps destined for landfills. For almost 40 years, his company manufactured upcycled fiberglass products for clients as big as Chicago's O'Hare Airport and Maywood Park horse racing venue. Not even a recent move to an assisted living facility can slow him down. When he discovered his new home had no recycling program, he championed an effort to start one. He's talked

with the kitchen staff about composting and with the landscaping crew about adding more raised garden beds. And at 89, he still picks up litter.

1957

Elliott Heith proudly shares: "I have three grandchildren – two teenage girls living in California and a teenage boy living in New York City. My older granddaughter just got accepted to the University of Edinburgh in Scotland. My younger granddaughter, a longtime soccer player, kicks extra points and field goals for the boys' junior varsity football team. My grandson has won one of 50 New York state writing awards and one of 50 national writing awards."

1964

Robert White and his wife, Ginny, have moved into their newly renovated home in Presque Isle, Maine, after 27 years in Caribou, Maine. He writes, "It's nice at our stage in life to have everything on one level!"

1974

Chris Cigal and his wife, Laurie, reunited with fellow WPI classmate **Tom Fieldsend** and his wife, Vonnie, in Bar Harbor, Maine. Chris and Laurie were



▶ CHRIS CIGAL '74, TOM FIELDSSEND '74 WITH THEIR WIVES LAURIE AND VONNIE

visiting the area from Georgia to hike in Acadia National Park. He writes, "We hadn't seen each other in 16 years and what was supposed to be an hour meal and conversation turned into almost four!"

1975

Jeffrey Webber has published his first novel, a sci-fi fantasy *Enimnori: Arrival*. The book, 20 years in the making, was first published in December 2021 by Newman Springs Publishing. The second book in the *Enimnori* series is due to be published in the fall of 2022, with two more in the works.

1980

Arthur Huggard was promoted to vice president of digital



▶ ARTHUR HUGGARD '80

technology at Build-A-Bear Workshop, where he has worked for the last five years. He says, "Leading the teams that run our award-winning website (www.buildabear.com) has been fun and certainly interesting, as the pandemic forced most of us to shop online. In my web career, I have gone from running the

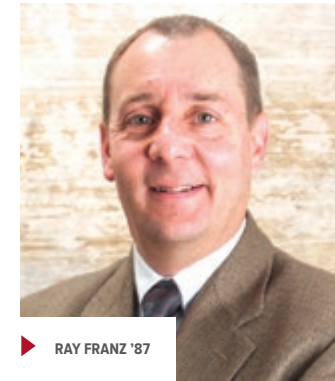


▶ JOHN KELLY '82

world's most macho website at Bass Pro Shops, to the least macho at Build-A-Bear. Previous positions also entailed running websites for Hudson Bay Company (North America's first corporation) and Sigma Aldrich – a science company that has sold almost a billion dollars of science supplies to research companies and universities online. I think I qualify for an alumni award as the person who has wandered the farthest away from my WPI degree in chemical engineering."

1982

John Kelly is retiring after almost 40 years with Pfizer. He writes, "Through this time, I have had the pleasure to work with so many amazing colleagues, many of whom have become good friends. I look back fondly on my experiences, with work locations in Brooklyn, Puerto Rico, and New York City, and business travels that have taken me to more than 30 countries, where I have learned of the many rich cultures that make up Pfizer. I have been fortunate to have many interesting and challenging assignments throughout my career, and I thank those leaders who gave me the opportunities. In turn, I have attempted to pay it forward in my leadership roles and through being actively



▶ RAY FRANZ '87

engaged in mentoring. A shout-out to the many mentees I have worked with and learned so much from. Through it all, I am very proud of the work Pfizer colleagues do to discover, partner, develop, and supply life-saving and life-enhancing medicines and vaccines of the highest quality to patients around the world, while operating our facilities safely and environmentally responsibly. I now look forward to spending more time with my family and whatever the future holds."

1984

Gail Baker joined the Board of Advisors of Capewell, an engineering aviation and life support solutions organization. According to a company announcement, her 35+ year career has included "leadership positions in engineering, program management, business development, mergers and acquisitions, global factory management, and P&L oversight." Her new role will help advance innovations in the design and manufacture of military equipment produced by Capewell. She has been a unit leader for a Fortune 500 aerospace and defense conglomerate and was responsible for \$11 billion in revenue during her time as president of Aftermarket Services for Collins Aerospace.

1986

Michael Duquette joined Precision Coating Company's senior management team as group vice president of operations. According to a company announcement, he will bring his years of experience in medical device manufacturing to his new role. "I'm drawn to innovative, growth-oriented companies with the vision to match their goals," he says. "I'm excited to join PCCI and am committed to helping my colleagues continue as global leaders in high-performance medical coatings."

George Aghajyan wrote an opinion piece for *The Armenian Weekly* titled "The Need for Earnest Dialogue." In the article, he discusses the detrimental impact of a society's inability to discuss topics to reach consensus during an open dialogue. He also details the issue surrounding the denial of Mourad Papazian's entry into Armenia and the discourse surrounding it. He is director of the Armenian Historical Archives and chair of the Armenian Revolutionary Federation Central Committee of the Eastern United States. In his retirement, he concentrates on Armenian-related research and projects focusing on the demographics and geography of western Armenia, Armenian genealogy, and genocide denial.

1987

Ray Franz was promoted to area manager of Northern California for Keller, the world's largest independent geotechnical contractor. According to a company announcement, he has over 30 years of experience in geotechnical consulting and specialty construction, and he has

worked with "micropiles, auger cast piles, anchors, dynamic compaction, rigid inclusions, vibro compaction, and various types of grouting." He started at Keller in 2003 and most recently worked as a pre-construction manager in Chicago. He is a member of the Geo-Institute of American Society of Civil Engineers and the Deep Foundations Institute.

Guido Jouret was appointed interim chief technology officer and senior technology advisor for Vivera Pharmaceuticals. He has over 25 years of experience in technology sectors such as software, services, networking, cloud platforms, and hardware. In his role he will provide guidance to help identify key areas of focus as the company develops the technology for ZICOH, its patented electronic prescription delivery device. "Technology lets us empower patients to take charge of their own healthcare," he says. "We can improve effectiveness and the overall quality of life in new ways. I'm excited to work with the team at Vivera to bring their innovative offerings to the benefit of millions of patients worldwide."

1988

Kate Donaghue (MS CS) was featured in a *Telegram & Gazette* article about her campaign for state representative of the new 19th Worcester District in Massachusetts. According to the article, she is a longtime political advocate and has worked on various campaigns, including her first in 1982 supporting Governor Michael Dukakis's reelection. After working in nonprofit advocacy, she says she turned her attention to political engagement because she saw it as a way to

make real change. After retiring as vice president of a software company, she says she now considers herself a “full-time candidate,” tirelessly pitching to voters on issues she cares about, including the opioid epidemic, healthcare, senior care, climate change, and supporting K-12 education. Many of these issues have personally affected her, including the loss of her son to opioid addiction and her husband to pancreatic cancer.

1990

Don LeBlanc has joined StackCommerce, a commerce and content platform, as CEO. He has extensive experience in e-commerce across business-to-business and business-to-customer brands. His new role will oversee the company's next phase of growth as it builds its commerce platforms. He says, “This is an exciting time to be stepping into a leadership role at StackCommerce, and I can't wait to see how we can further disrupt the industry, solidify our commerce and content expertise, and build better tools for all our partners. I believe in the value of commerce storytelling as an elegant advertising solution that will remain powerful for the foreseeable future, and I'm very much looking forward to working with the whole Stack team.” Don has over 20 years of experience working for companies such as VistaPrint, Simplisafe, and Staples.

1991

Gerry Burns, who has worked as a serial CEO and business consultant, reports he is dedicating himself to coaching and training individuals and teams with a focus on applying conscious

leadership to one's personal and professional journey through practical applications and experiences. These retreats can span multiple days and support views toward curiosity, learning, openness, and responsibility. Previously, he served as an advisor and mentor to WPI students as part of the WPI Tech Advisors Network and was a guest speaker in the WPI course *Engineering Innovation and Entrepreneurship*. He also has advised leaders of start-ups and established businesses in markets such as high-tech manufacturing, Web 3.0, and artificial intelligence.

1992

Daniel O'Connell was named vice president of strategic accounts at Yield Engineering Systems (YES), a leading manufacturer of process equipment for semiconductor advanced packaging, life sciences, and “More-than-Moore” applications. He has been with the company since November 2021. According to a company announcement, he will “work closely with the company's sales, marketing, and technology teams to nurture strategic customer relationships and ensure YES's alignment with current and future customer technology requirements.” He has extensive experience in the semiconductor industry and has held various management and leadership positions.

1993

Dayna Badhorn was named regional president for Avnet's electronics parts group. According to the company's announcement, in her new role she will “oversee all actions tied to Avnet's electronics parts enterprise and handle the

operations group supporting enterprise within the area.” She has worked for Avnet for 23 years and previously served as international vice president of strategic planning and company advertising. About the new role, she says, “It's an honor to be named to this role at such a pivotal time within the distribution business. I look ahead to additional delivering on Avnet's century-long promise of delivering best-in-class options that assist our companions and suppliers to meet their evolving wants.”

Michael Brown was appointed vice president for Canadian businesses at Davis-Standard, an organization that develops and distributes extrusion and converting technology. According to an announcement in *Plastics Technology*, he will oversee the business operations plans, strategies, and performance initiatives for the organization's Toronto-based subsidiaries. He recently worked for Gillette/Procter & Gamble as operations manager for injection and extrusion operations. He has extensive experience in expanding businesses' profitability, safety, aftermarket services, lean manufacturing, and footprint utilization.

Peter Cavallo was recently presented with Temple University's Part-Time Faculty Excellence in Teaching and Instruction Award for 2021–2022. According to a Temple announcement, the award “recognizes part-time faculty members for their high-quality pedagogy; efforts to evaluate, assess and improve one's own teaching; and mentorship fostering academic and professional achievements of students.” He received one of only three awards presented annually

to adjunct faculty and is the first faculty member selected from the College of Engineering. He teaches fluid mechanics, aerodynamics, compressible flows, and computational fluid dynamics in Temple's Mechanical Engineering Department.

Jason Chin has joined Vision Government Systems as chief technology officer. Vision supports various aspects of property appraisals across the United States. He writes, “Blessed to be joining as CTO in a time of incredible business growth and opportunity. Can't wait to learn all the ins and outs of the business and what makes us the leaders in driving digital change in the property assessment industry!”

Shilpa Shroff was named vice president of process sciences by Scribe Therapeutics, a California-based molecular engineering company that creates technologies for CRISPR-based genetic medicine. She brings two decades of manufacturing and technology experience from BioMarin Pharmaceutical, where she served as executive director of technology development in process science. She earned her PhD at the University of California and her MS at Stanford University.

Steve Vassallo was interviewed on Daniel Scrivner's podcast *Outliers* and discussed topics such as “Minimum Awesome Product,” the prepared mind vs. open mind, and learnings from tearing down and rebuilding an investment firm. Vassallo is a general partner at Foundation Capitol. About the interview, Scrivner says, “Very few venture firms survive a single decade, let alone multiple decades. And those that do survive for decades have to reinvent themselves time and time again, which is exactly why I

wanted to interview Steve Vassallo. Over the last 15 years, he's helped reinvent Foundation Capital, turning around lagging performance, investing in entirely new types of businesses and companies. And in the process, he's helped usher in an incredible new era at Foundation Capital.”

1994

George Willwerth is president of Colantonio, one of the largest construction management firms in Massachusetts. He has been with the firm for 28 years, and was appointed president in 2015. He first worked for the company while earning his civil engineering degree at WPI. In his role as president, he oversees all estimating, project management, field supervision, and contract negotiations. He says, “The most rewarding part of my job is the interaction with Colantonio personnel and seeing the professional growth we've all had in our tenure here. I also get a lot of personal satisfaction at the end of a project when the client is moved in and happy, and ultimately all parties see it as a success.”

1996

Joseph Maraic, a partner at the Boston-based law firm Burns & Levinson and co-chair of its intellectual property group, has been named a 2022 IP Star by *Managing Intellectual Property* for the ninth consecutive year. The IP Stars list includes the country's leading intellectual property professionals who have been highly recommended by their clients and peers. According to the firm's announcement, he is “considered a visionary by his

engineering arts and biotech clients for his uncanny ability to look at a new technology and visualize exactly what the company is trying to accomplish and how it can be incorporated into a commercial product.” The announcement notes his range of experience in several industries, including medical devices, LED lighting solutions, semiconductor equipment, power supplies, lasers, image processing devices, and machine learning, among others.

1997

Michael Driscoll was appointed artistic director of Commonwealth Chorale, an adult community chorus based in Newton, Mass. He says, “I am excited to begin working with Commonwealth Chorale. I remember attending one of their performances 20 years ago when I first moved to Boston, and I was impressed with the quality of their performance. I look forward to carrying on the excellent work of David Carrier and the talented singers of Commonwealth Chorale.” He has served as a music director and a music teacher for various organizations throughout Massachusetts.

1998

Dianne Kelly (MS) is now president of Massachusetts Association of School Superintendents (MASS). According to an article in the *Revere Journal*, she has been superintendent of Revere Public Schools since 2015 after having been a math teacher in Revere, among other roles. She says, “It is definitely humbling to know that people who are your colleagues in education feel that way about your work and trust you enough



▶ MICHAEL DRISCOLL '97



▶ DEEPTHI BATHINA (MS) '00

to lead the MASS.” She will work with other Massachusetts superintendents to push education goals and initiatives for the next year. She has served on several educational committees and in such roles as dean of students, district director of mathematics, and assistant superintendent.

1999

Jeffrey Hastings was featured in an article by *The Reminder*, a publication based in Western Massachusetts, regarding his recent installation as the Melha Shriners' 112th potentate (president). He earned his MS in biomedical engineering at WPI, worked in areas of biomechanics research and development, and currently works for BizTech Solutions as a senior interface developer. According to the article, the Melha Shriners are currently celebrating 125 years of community service, which Hastings now leads. He serves as a representative to Shriners International Fraternal Corporation and the Shriners Hospital for Children Corporation. He is also a member of the Melha Highlanders, a Scottish pipe band, in which he has played the snare drum for the past 25 years. Currently, he is the chief (president) of the band

after serving as secretary for many years.

Jose Jimenez was named vice president and director of life sciences at Gilbane Building Company, which provides a range of construction and facilities-related services. According to a company announcement, his role will “support Gilbane's life sciences clients across Pennsylvania, New Jersey, Maryland, Washington, DC, and Virginia.” His professional experience includes work in construction management and medical device manufacturing. He was also featured in the BioBuzz “5 Questions With...” series, discussing his education, career, and current trends in the biopharma sector.

2000

Deepthi Bathina (MS) was appointed to the Advisory Board of ManagingLife, a digital health start-up that aims to lower the cost of chronic pain for insurers, employers, and health systems through its clinically validated digital solution, Manage My Pain. She also recently joined the Board of TCV Acquisition Corp, a special purpose acquisition company of TCV, a private equity firm specializing in growth-stage technology, and has been invited

to be a member of Extraordinary Women on Boards (EWOB), a networking organization for senior executives who serve on public or private boards and focuses on raising the presence and influence of women in the boardroom. Boston University invited her to be the keynote speaker at its annual graduate student conference focused on “Uncovering Experiences for Actionable Insights” to discuss the AI in healthcare. She is a senior healthcare and technology executive with a range of experience, from start-ups to Fortune 50 companies. She is currently CEO and founder of HealthTech Ventures and advises executives, boards of directors, and investors in the health technology sector.

2001

Jason Ferschke was featured in a *Milford Daily News* article after being named Natick’s new fire chief. He previously served as Westborough’s deputy fire chief, starting in 2016. During his time at WPI, he lived in a firehouse and became a junior firefighter. According to the article, while growing up in Auburn he became interested in firefighting at an early age. After his time as a junior firefighter, he became a call firefighter in 1996 and has risen through the ranks ever since. In addition to getting to know the Natick community, one of his other goals as the new chief is to improve emergency medical services after the closure of the MetroWest Medical Center. He told the reporter, “I’m looking forward to working in Natick. It’s a great community.”

Paul Muller was recently promoted to the rank of colonel in the United States Air Force. He

and his wife, **Amanda (Kight) Muller**, currently reside in Arlington, Va. He is stationed at the U.S. Department of Energy, National Nuclear Security Administration; she is a consulting artificial intelligence systems engineer at Northrop Grumman.

Thomas Collins was hired by ProofID as a professional service engineer. The UK-based company is an identity security partner and service provider that delivers methodologies for digital user experiences. His role on the professional services team will focus on service delivery and he will work remotely from Worcester with the U.S. subsidiary in Colorado. He writes, “It’s a big change from being internal IT for two great academic institutions (WPI and Northeastern), but I’m up for the challenge.”

2002

Liz Hitchcock won a Merit Award of Excellence from PLAN NH for her property The Factory on Willow. The award recognizes the property’s positive impact on the surrounding community through good planning, design, and development, according to an article in the *New England Real Estate Journal*. The apartment complex, created from a former mill building in Manchester, features 76 live/work apartments and micro-hotel units, commercial/retail tenant spaces, event space, and large outdoor areas.

2004

Ben Sandofsky, founder of an app development company, Lux Optics, recently won a 2022 Apple Design Award for his app “Halide Mark II.” The camera app works to mimic a film camera and allows users to customize their

photography with the iPhone and iPad. This app is meant to help users create more dynamic visuals in their digital photography.

Jeremy Hitchcock will be honored with the Walter R. Peterson Award for Education and Public Service by the Community College System of New Hampshire. The award is presented to an “individual whose contributions best exemplify the values of public service and dedication to higher education.” He is a technology entrepreneur and investor in areas that include internet performance management and cyber and next-generation communications. He also owns an independent bookstore in Manchester, N.H., and The Factory on Willow, a workspace for creators, innovators, and entrepreneurs.

2007

Michael Couts was named in an *Energy Northern Perspective’s* publication that featured the new Bayonet Ocean Vehicles team. The company develops, manufactures, and distributes an amphibious robot line and is the latest to join the Greensea Systems group. He is the mechanical engineer of the team and has extensive experience in the ocean robotics industry. He has overseen the concept, design, prototype, and pre-production builds of two new product lines.

2008

Ryan Graves appeared on the *Lex Fridman* Podcast, one of most prominent tech forums worldwide. In the 2.5 hour interview, Ryan talked about his various experiences in the Navy. Topics discussed include fighter jets, UFO sightings by the U.S. military, and

autonomous weapons systems, among others.

2009

Nicholas Pelletier was named 2022 Realtor of the Year by the North Central Massachusetts Association of Realtors (NCMAR). According to an article in the *Leominster Champion*, “this award is given annually to the Realtor who best exemplifies professionalism and service to the industry based on volunteerism, civic engagement, and outstanding achievements on local and national levels.” In addition to serving as the current president of NCMAR, he is also president of Pelletier Properties, which focuses on revitalizing abandoned properties in North Central Massachusetts. His volunteer activities include serving on the boards of St. Bernard’s High School in Fitchburg, Mass., and the Rise Above Foundation in Worcester, which provides enriching opportunities for foster children.

2010

Vishal Sunak’s company, Link-Squares, was featured in the *Boston Business Journal* list of Best Places to Work in 2022. The company was listed No. 1 in the medium-sized category. According to the announcement, the company puts a lot of focus on employees’ mental health and paid time off, including parental leave for fathers and mothers. The Boston-based firm, founded in 2015 and employing just over 250 people, provides software to business clients across a range of industries that use artificial intelligence to find key terms, like particular names, dates, or clauses.



▶ MARJOLAINE AND JUNIPER

2011

Linnea Paton and **Guillaume Marceau ’12** welcomed twin girls, Marjolaine and Juniper, in April of this year. They write that their oldest daughter, Adaline, “is thrilled to be promoted to ‘big sister’ status!”

2012

Julie Mullen’s company Aclarity was featured in a story for BusinessWest.com. The article discusses the company’s advancements in water treatment technology—a novel electrochemical approach to combating pollutants in water. The process destroys “forever chemical” compounds and breaks them into their component parts by passing an electrical current through the water. Julie, who co-founded Aclarity in 2017, won the top award at the UMass Innovation Challenge, claiming \$26,000 in seed money to help jump-start the company.

2013

Nathan Fournier was featured in *This Week in Worcester* about his company, HomeHarvest Central MA, a full-service landscaping company with a focus on “regenerative agriculture” and “permaculture.” The article discusses his focus on creating environmentally friendly



▶ PROFESSOR DOUG WEEKS WITH CASSANDRA LAROCHELLE ’13 AND CHRIS RENE ’20

outdoor spaces that can produce food and attract pollinators, which creates a natural ecosystem that supports each aspect of a person’s yard. He told the reporter, “The age of the grass lawn is over,” and that permaculture works “in a cohesive symbiotic way with nature instead of using brute force.” He is also a general contractor, real estate investor, a member of the Green Worcester Advisory Committee, and vice president of the Worcester Rugby Football Club.

Cassandra LaRochelle ran into Professor Doug Weeks at the performance of *Turandot* at Opera51 in Concord, Mass. She was one of the horn players in the orchestra. Weeks noted that Cassandra was a recipient of the Kranich Prize during her time at WPI and said, “It was a real treat to work with her and nice to see she is utilizing the skills and knowledge she acquired in HUA at WPI.” Cassandra remarked, “It’s always

fun running into other WPI musicians!”

Jean Paul Miralda has been named chief operating officer at Emerge, an IT services and IT consulting company based in Toronto. His new role started only months after joining the company and he hopes to utilize his position to enable more humanitarian and social-equity projects within the organization. Emerge focuses on pioneering humane innovations by offering impact-as-service in emerging technologies and Web3 space.

2014

Martins Zaumanis published the book *Peer Recognized*, which is aimed at scientists who want to improve their presentation skills. The book includes a story about Higgins House and Martins’s time as a student at WPI. This book is part of a series he is writing about scientific

communication and each book will refer to his time at WPI.

2016

Sarah Hernandez was named director of research programs at the Hereditary Disease Foundation, which “funds research to find treatments and cures for Huntington’s Disease.” According to a company announcement, she has spent her education and career researching Huntington’s Disease—a condition that has affected her family. Her role at the foundation will oversee its “scientific research portfolio and work closely with its Scientific Advisory Board to identify the most promising research and make recommendations for funding.”

2017

Amogh Raghunath discussed his work to create a tool that analyzes refugee data in an interview on *Tech Bullion*. He currently works with Audible (an Amazon company) in Newark, N.J., as a software engineer. His work includes designing or blueprinting data platforms used to solve various data science/business intelligence and marketing needs. During his time as a master’s student at WPI, he worked with Professor Andrew Trapp on a research project that involved the LIRS organization, a refugee resettlement agency. The project created an automated process for finding the best places to send refugees once they arrive in the United States.

2019

Professor Doug Weeks shared that he discovered **Kerry Muenchow** is a member of an orchestra he



▶ EMPLOYEES OF CONSIGLI CONSTRUCTION, INCLUDING MADELYN URYASE '22 AND OTHER WPI ALUMNI, PARTICIPATED IN OPERATION PLAYHOUSE.

conducted in Connecticut recently. According to Weeks, she also recently played in a concert at the Unitarian Church in Worcester. During her time at WPI, she played first violin in the Medwin Honors Quartet and was the orchestra concertmaster. He writes, “She’s from Colorado and the decision to attend WPI was largely because of the opportunity to play in the orchestra.”

2020

Chris Rene ran into Professor Doug Weeks (see page 61) at the performance of *Turandot* at Opera51 in Concord, Mass. He was part of the brass ensemble for the performance. Weeks remarked that Chris was a recipient of the Kranich Prize when he was an undergraduate at WPI and is still actively

involved in music. Chris says, “It was fantastic to play with Doug again and meet others who have been taught by him as well,” noting that another WPI alum, Cassandra LaRochelle, was also part of the brass ensemble.

Tej Sheth was the subject of an article in *The Eagle-Tribune* that discussed his career at Amazon, where he has worked since graduation. At the new Amazon facility, due to open in North Andover, Mass., he will work on the systems design of robotics to help meet the needs of the fulfillment network. According to the article, he worked as a solutions design engineer on 17 robotic fulfillment centers for Amazon before moving into his current position. He cites WPI’s project-based learning as something that helped him succeed in the robotics field.

2022

Madelyn Uryase participated in Operation Playhouse, an event sponsored by Habitat for Humanity International that provides custom playhouses for the children of veterans. Her team was assigned the daughter of a U.S. Marine who served two tours in Iraq and received a Combat Action Ribbon. Her employer, Consigli Construction Co., gives employees paid time to volunteer and, having been a student volunteer as part of WPI’s Alpha Phi Omega fraternity, she says she jumped at the opportunity to help on this project.

Three teams of Consigli employees (30 people total) headed to Elm Park for the Operation Playhouse Build-a-Thon hosted by Habitat for Humanity. She says, “Of the 30 employees,

there were three other WPI alumni present (**Will Feraco '14**, **Caitlin Kelley '12**, and **Janice Narowski '01**). This event consisted of building a playhouse from a kit created by a local technical school. The three houses we built were of the themes Patriotic, Log Cabin, and Cozy Cottage, that the children were able to select themselves. From 8 a.m. until 5p.m. we painted, learned some roofing skills, assembled the house, and added our own decorations specific to each child. We were fortunate enough to meet each family and present their children with their very own ‘certificates of occupancy’ for their new playhouses. Seeing how happy it made them made this experience truly rewarding and it is something I can see myself doing again for many years to come.”

Laura Menides, Professor, Poet, and Champion of Worcester’s Literary History

Laura Jehn Menides, professor emerita of literature at WPI, poet, and champion of the poetry community and the literary history of Worcester, died July 22, 2022, after a long battle with Parkinson’s disease. She was 85.

Menides joined the WPI faculty in 1976 after teaching at Finch College in Manhattan and at the University of Chicago, where she earned a master’s degree in language and literature. She also held a BA in that field from Queens College of the City University of New York and a PhD from New York University.

A scholar of American literature and an active writer and poet (her output included books of original poetry, short stories, and children’s stories), she collaborated with WPI music professor David McKay on an opera based on William Faulkner’s novel *As I Lay Dying*. The opera debuted at the 1991 International Faulkner Conference at the University of Mississippi.

Menides worked hard to raise the profile Worcester’s notable literary figures. Students she advised completed a series of IQPs that created plaques for the homes of such writers as Esther Forbes (author of *Johnny Tremain*) and poets Frank O’Hara and Elizabeth Bishop. She organized the Elizabeth Bishop Conference and Poetry Festival in 1997, which included readings and presentations by such giants of poetry as Donald Hall, Adrienne Rich, and Kathleen Spivack.

She also actively promoted and supported the local poetry community, helping found and serving as president of the Worcester Country Poetry Association and frequently organizing events and readings by poets – the up-and-coming and the internationally recognized, including Stanley Kunitz and Maxine Kumin.

She is survived by her son, John Menides, and her daughter, Georgia Menides. Her husband, Byron Menides, formerly an instructor in management and an assistant football coach at WPI, passed away in 2017.

—Michael Dorsey

Nominate WPI Alumni

Each year, the WPI Alumni Association presents awards to deserving alumni in recognition of their professional achievements, service to the university, service to the Alumni Association, and service to their local communities. Nominations are open for the 2023 award cycle.

Nominate alumni from classes ending in 3 or 8 today!

LEARN MORE ABOUT THE ALUMNI AWARDS AT [WPI.EDU/ALUMNI/AWARDS/ABOUT](https://wpi.edu/alumni/awards/about)
NOMINATE A DESERVING ALUMNA/US AT [WPI.EDU/+ALUMNIAWARDFORM](https://wpi.edu/+alumniawardform)



[*in memoriam*]

Audrey Carlan, MS '57, WPI's first female graduate

Audrey Carlan, who earned a master's degree in physics as WPI's first female graduate student, passed away on Sunday, July 17, 2022, at the age of 91. In 2017, she received an honorary degree from WPI in recognition of the trail she blazed for generations of women who came after her.

After they were married, Audrey and her husband of 55 years, Alan, took jobs at American Optical (AO) Company in Southbridge, Mass., and began taking WPI graduate classes offered at AO. They were trailblazers in the newly developed computer science projects pioneered at WPI and were the only students from AO who continued classes on the WPI campus. Their simultaneous graduation, both with master's degrees in physics, was especially remarkable.

Audrey and Alan went on to have two sons and a daughter (their first son, Steve, was born just weeks after that 1957 WPI

commencement) and established careers as mathematicians and physicists. Earning an MS was the beginning of a career in which Audrey paved a path so many working moms face today. In an age when fewer than half of mothers worked outside the home, she not only thrived in the workplace, but was able to carve a niche and a career that nourished her curiosity. Within years, she moved to teaching, in part for the flexibility. She became a professor emerita of mathematics at Southwest Community College in Los Angeles and authored *Everyday Mathematics for the Numerically Challenged*.

Throughout her life, science held an unmistakable appeal for her. AO gave her a glimpse of what was to come—fiber optics and lasers—and that was where she worked on the earliest continuous vision lenses (now known as progressive lenses). Her team also worked on Todd-AO, the groundbreaking film projection system for the big screen version of "Oklahoma!"

Audrey was preceded in death by Alan. She is survived by her children Stephen, David (Sylvia), and Sue Reynolds (Michael), and her grandchildren Joshua and Solonia Reynolds. She will always hold a place in WPI's history as the first woman to earn a WPI degree—15 years before the first female undergraduate degrees were conferred.

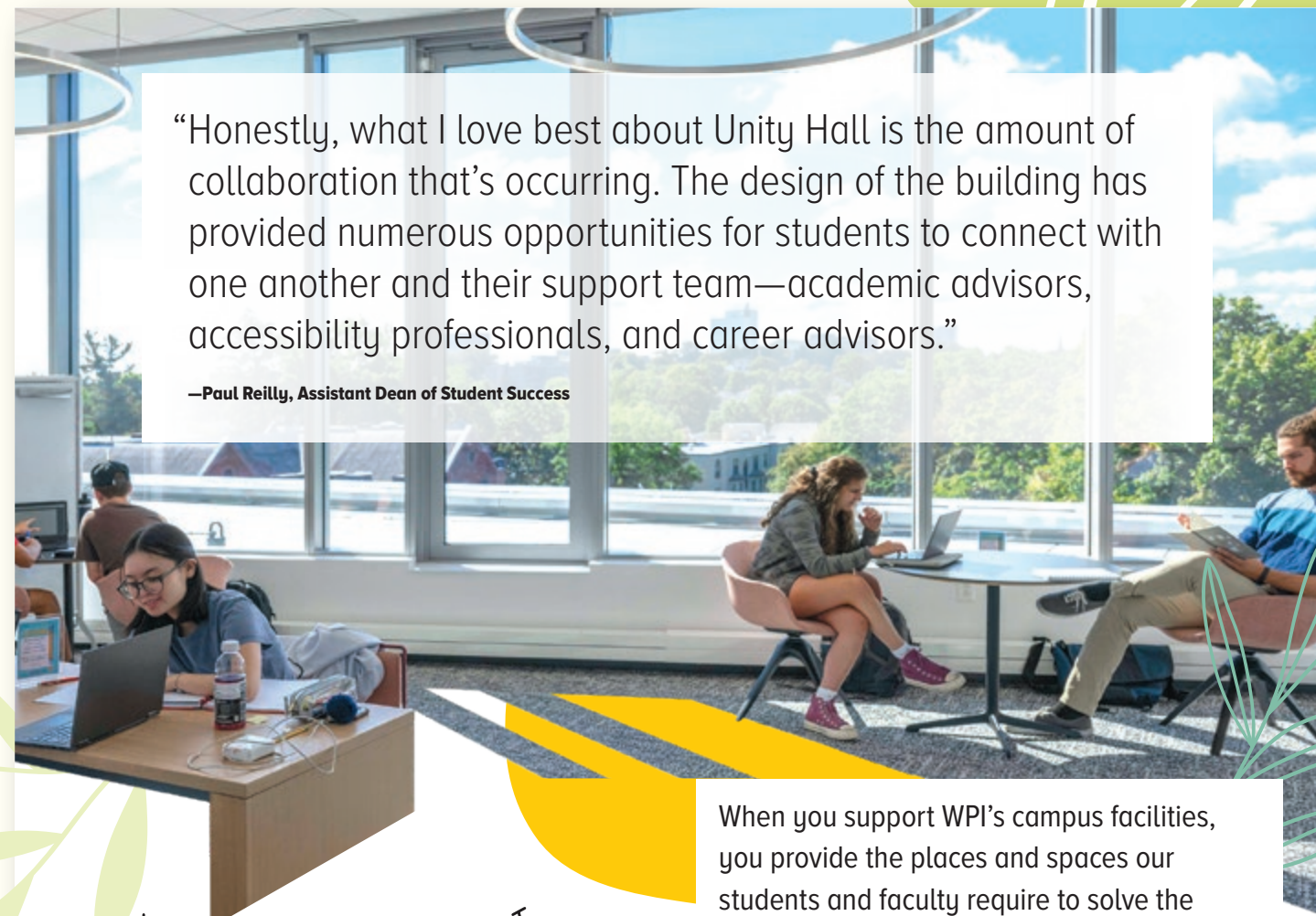
—Judith Jaeger

Ralph Smith '43, CHE, SIGMA ALPHA EPSILON, Kennebunk, Maine
Kimball Woodbury '44, ME, SIM, THETA CHI, Worcester, Mass.
Warner Sturtevant '45, ME, PHI SIGMA KAPPA, Escondido, Calif.
Ellsworth Sammet '49, CE, SIGMA PHI EPSILON, Craftsbury, Vt.
David Flood '50, CHE, THETA CHI, Friendship, Maine
Edward Kacmarcik '51, ME, ALPHA TAU OMEGA, Newburgh, N.Y.
Harry Mirick '54, EE, SIGMA PHI EPSILON, Orleans, Mass.
Christian Baehrecke '56, CE, ALPHA TAU OMEGA, Paxton, Mass.
Albert Battista '56, EE, PHI KAPPA THETA, Norwalk, Conn.
Richard McBride '56, CE, PHI SIGMA KAPPA, Bethesda, Md.
Audrey Carlan '57, PH, Rancho Palos Verdes, Calif.
Richard Chapman '58, CE, Englewood, Fla.
Arthur McGowan '58, ME, PHI GAMMA DELTA, Topsfield, Mass.
Anthony Morrison '59, ME, Waterford, Conn.
Morgan Whitney '59, EE, PHI GAMMA DELTA, Saint Clair Shores, Mich.
James Teixeira '60, EE, East Falmouth, Mass.
Ralph Guertin '62, EE, LAMBDA CHI ALPHA, Sutton, Mass.
James Keating '63, EE, LAMBDA CHI ALPHA, Wethersfield, Conn.
Stephen McCabe '64, SIM, Plymouth, Mass.
John Preisser '64, MS PH, Williamsburg, Va.
Robert Varnum '64, EE, SIGMA PHI EPSILON, Naples, Fla.
Heyward Williams '66, CHE, TAU KAPPA EPSILON, West Palm Beach, Fla.

Charles Goodspeed '67, CE, MS CE, SIGMA PHI EPSILON, Alexandria, Va.
Robert Renn '67, ME, THETA CHI, East Orleans, Mass.
Stephen Hammond '69, CE, THETA CHI, Chester, N.J.
Lawrence Cohen '70, CHE, ALPHA EPSILON PI, South Easton, Mass.
Michael Vardeman '70, PH, Margate, Fla.
James Anderson '72, PH, SIGMA PI, Mystic, Conn.
Joseph Kalinowski '73, BS MG, MBA, PHI GAMMA DELTA, Holden, Mass.
Irving Paton '78, SIM, Merrimack, N.H.
Robert Moller '82, BME, LAMBDA CHI ALPHA, Worcester, Mass.
Jack Bravo '84, EE, Jefferson, Mass.
Richard Willett '91, EE, THETA CHI, Wellesley, Mass.
Eric Rogers '99, ME, Blairsville, Pa.
Megan Concannon '19, CE, ALPHA XI DELTA, Austin, Texas
Ryan Cumings '21, MS EE, Exeter, N.H.
Sean Roorda '21, MS MTE, New Hampton, Iowa

The WPI community also notes the passing of these friends of the university: **E. Malcolm Parkinson, Marjorie Pearsall.**

Complete obituaries can usually be found online by searching *legacy.com* or newspaper websites. The Alumni Office will assist classmates in locating additional information. Contact alumni-office@wpi.edu.



“Honestly, what I love best about Unity Hall is the amount of collaboration that’s occurring. The design of the building has provided numerous opportunities for students to connect with one another and their support team—academic advisors, accessibility professionals, and career advisors.”

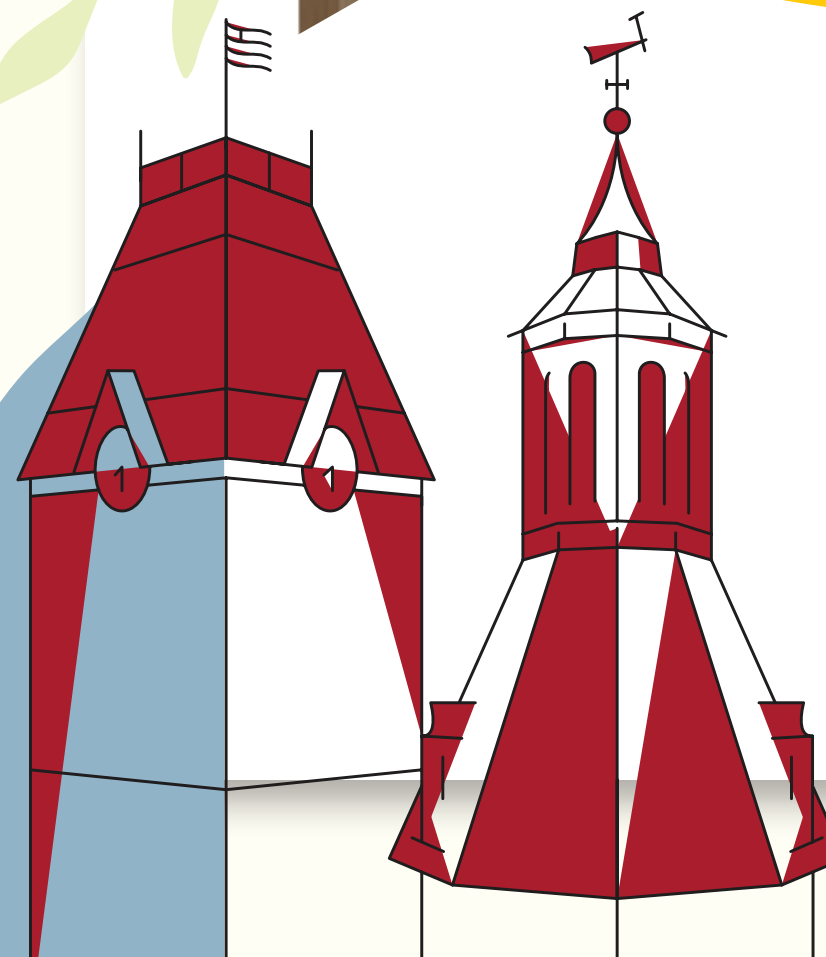
—Paul Reilly, Assistant Dean of Student Success

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THIS YEAR'S FIRST-YEAR WELCOME EXPERIENCE CONNECTED NEW STUDENTS TO THE CAMPUS, THEIR PEERS, AND SOME OF THE MANY RESOURCES AVAILABLE DURING THIS CRITICAL TRANSITION PHASE AND BEYOND. MORE THAN 1,200 STUDENTS OF THE CLASS OF 2026 (900 IN-PERSON, ANOTHER 300 ONLINE) PARTICIPATED OVER TWO WEEKS IN JUNE. LEARN MORE ABOUT THIS PILOT PROGRAM FROM PAUL REILLY, ASSISTANT DEAN OF STUDENT SUCCESS, ON PAGE 18.

